Omnia ONE Multicast

Audio Processor with SENSUS®

Installation and Operation Manual
Version 0.9i / March 2007
Applicable to v1.0 Release Software

January, 2007

Welcome to Omnia.ONE!

I wish to offer my sincere gratitude on behalf of our company and welcome you to Omnia.ONE!

This manual was assembled by a dedicated team of specialists who were instrumental in the development of our newest product, Omnia.ONE. This is our next step in the never-ending quest to build the best signal processor in the world. Considerably more powerful than what its small package implies, Omnia.ONE possesses new hardware and algorithm capabilities that even exceed its predecessors. It is also the first audio processor to incorporate *LiveWire* connectivity, enabling linear audio over dedicated networks. It's the hottest 'interconnect' technology in the professional audio industry today.

Broadcasters require a lot of flexibility in an audio processor because transmission systems exist in many different forms. The processor you choose must have the tools to meet those needs. Special firmware inside Omnia.ONE allows it to meet the challenges of FM, AM, HD Radio, DAB, DRM, Multicasting, Podcasting, Netcasting, Satcasting, and any other form of '*casting*' you can think of. There's plenty of power inside its little 1U frame, so don't let the size fool you!

It was 1986, in the engineering shop at Z-100, (WHTZ-FM) New York City where our first product was born - *The Vigilante FM Limiter.* Twenty-one years later and with an incredibly talented team of designers behind it, we offer you the newest baby in our ever-growing family, Omnia.ONE!

Speaking of the team, I wish to offer a sincere and heart-felt thank you to: *Rob Dye, Bill Mohat, Ed Zmuginsky, Mark Manolio, Ted Alexander, David Jablonski, Scott Stiefel, Sean Overberger, Betty Ferrell, Steve Kiffmeyer, Denny Sanders, Marty Sacks, Mike Dosch, Kirk Harnack, Mike Uhl, Jim "Clemenza" Armstrong, Marc Johnson, Ken Skok* and a host of others (as you can see, it's not just "Frank" anymore!). It's a great team of people who always maintain *one* goal in their minds…**keep raising the bar!**

Steve Church, my partner in crime and founder of Telos, first introduced DSP technology to broadcasting in 1985. Our team of DSP gurus is the finest in the audio industry. Our own specialized DSP ingenuity has been tremendously beneficial to Omnia's development.

You have in your possession an incredible audio processor. Also, you have the full support of our entire organization standing behind the product. If you have feedback, or even a new idea, we're here to listen! Customers, like you, offer us valuable feedback. After all, it's feedback like yours that helped us introduce the original Omnia.fm, and then take the industry by storm. Our quest today, just as it has been all along, is to continue to be the audio processing brand leader.

To borrow a phrase from my old stomping grounds, Z-100 in New York City, Omnia went from *worst to first* in the minds and ears of radio broadcasters. We are honored, equally humbled to say the least, and grateful to you, our customers, for helping us make that happen! Omnia processors have been installed by tens of thousands of broadcasters throughout the world, and I am overwhelmed when I look at the list of our end-users. So, it's to you, our loyal customers and friends, that I say *Thank You!*

To Great Sounding Audio…the World over!

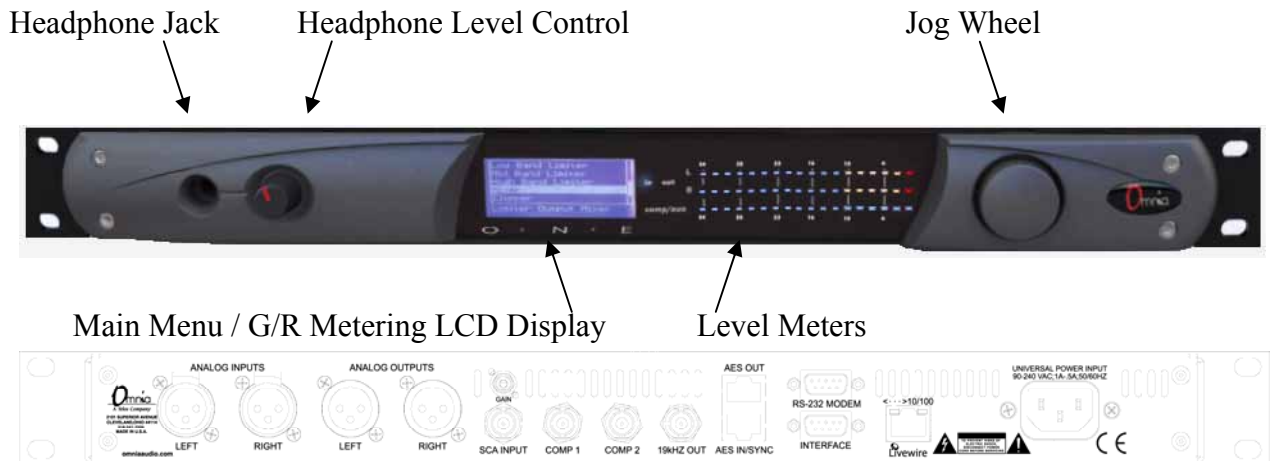**Frank Foti**
President, Omnia Audio

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OmniaONE Quick-Start Setup

We know that you're probably in a hurry to begin using your new OmniaONE Multicast. If you have technical expertise and previous knowledge of audio processor fundamentals, using our Nine-Point Quick-Start will get you up and running as quickly as possible. Please refer to the remainder of the Operating Guide for additional installation and setup information. Refer to the following illustration for the location of the various controls and connectors associated with the installation:

Headphone Jack   Headphone Level Control   Jog Wheel

Main Menu / G/R Metering LCD Display   Level Meters

1. Install the OmniaONE in the equipment rack using at least two rack screws. If only two screws are used, they MUST be installed in the bottom holes of the rack ears!

2. Connect AC power to the unit (there is no power switch!)

3. Connect the audio inputs that are appropriate for your installation.

4. Navigate to the Input/Output / Meter Select setting and select **Input**.

5. Navigate to the Input/Output / Input / Input Src setting and select the **Analog** or **AES/EBU** input as appropriate for your installation. If your audio source is providing an audio feed you should then see meter activity on the LED bargraph meters.

6. While driving the inputs with typical program material at normal operating level, navigate back up to the Input/Output / Input menu (by highlighting and clicking on the "<-EXIT" option) and adjust the appropriate input **Level** control until the peak-reading input bargraph meters are peaking up to at least –15 and up to –12 dBFS or a little higher.

7. Connect the audio outputs in a manner that is appropriate for your installation.

8. Navigate to the Input/Output / Output Menu and adjust the appropriate output **Level** control so that the output level is correct for the equipment that follows the OmniaONE.

9. Navigate back to the Main Menu, highlight **Preset:** and click. Rotate the jog wheel to display the preset appropriate for the program material and bitrate of the following codec and click to select it.

The OmniaONE Quick-Start Setup is now complete.
Please read on to learn about some of the features that make the OmniaONE Multicast unique beginning with the section: *Sensus*® Technology: Audio Processing[x3] on .

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Omnia.Multicast

Sensus® Technology: Audio Processing[x3]

Overview

Until now, digital signal processing has been a more precise numeric implementation of well-known analog methods. Even relatively recently designed digital audio processors couldn't veer too far from the comparatively simplistic concepts that analog dynamics processing had utilized… until now!

Extremely high power DSP chips have become available and at relatively low cost, and they make it possible to build smarter and more complex processing algorithms that were too difficult or impossible (or too expensive) to do in the past.

Running on a platform of the latest high power DSP chips, the OmniaONE and our new *Sensus®* technology takes digital dynamics processing into a completely new frontier. Instead of the two-dimensional static processing architecture of the past, *Sensus®* enables the audio processor to modify its own architecture in real time and in response to ever-changing program content.

Simply stated, *Sensus®* has the ability to "sense" what must be done to a signal in order to best tailor it for the following codec. As program content changes, it "rearranges the algorithms" to accomplish this goal. The uniqueness of the *Sensus®* technology makes it highly suitable not only for codec pre-conditioning (or provisioning), but also for a range of other highly specialized signal processing challenges. The following is a discussion of how *Sensus®* technology can be applied to a coded audio environment.

Codec Provisioning

The codec is now a common denominator in the world of audio and broadcasting. Digital broadcasting (HDTV, HD-Radio[R], DAB, DRM), podcasting, webcasting, cellcasting, and downloadable music files all employ a form of codec-based data compression in order to minimize the bandwidth required to transmit data. The necessarily low bitrates utilized by these mediums presents a tough challenge for any audio processor used prior to a codec.

Traditional dynamics processors were designed to fulfill the requirements of a medium where the functions were generally *static.* That is, they were well suited to the rather simplistic peak control

and bandwidth limiting methods that were required for analog broadcasting, as well as for the signal normalization techniques used in recording and mastering.

Audio codecs on the other hand are moving targets - each codec algorithm has its own set of artifacts. So not only does the sonic quality vary depending on the algorithm and bitrate used, but more importantly they vary in their ability to mask their own coding action. This is why we call it a 'moving target', and is why conventional audio processors fall short in a coded audio environment and can actually make coding artifacts worse due to their inability to adapt appropriately to the changing operation of the codec as the program content changes.

Prior art in audio dynamics processing could only address *some* of the challenges of provisioning audio for coding. This hurdle existed because the codec adapts to the incoming program (so as to generate the least amount of output data representing the input audio) causing the sonic artifacts generated by the process to continually change. Unless the audio processor can predict these changing characteristics of the codec, it can't possibly create output audio that is perfectly tailored for the coding process.

Conventional processors utilize rather simplistic high frequency limiters and fixed low pass filtering that does not change with the program material. When these less intelligent processors feed a codec the audio might sound acceptable one moment and offensive the next. Because they cannot "know" what the codec will do next, the result is over-compensated, dull and lifeless audio… audio that *still* contains objectionable codec-generated artifacts!

OmniaONE Multicast and HD® Radio

The advent of HD Radio[R] has introduced the capability to transmit multiple program streams, or "Multicast", within a single 96kbps digital broadcast data channel. To facilitate this, multicast relies on the use of codecs with comparatively low bitrates. A broadcaster can choose to transmit a number of multicast channels and select the bitrate for each one. However, the more multicast channels there are, the lower the bitrate each channel must have in order for them to all fit within the total available bandwidth.

In the very near future, many low bitrate multicast audio channels might exist. To achieve maximum sound quality, *the kind that attracts and holds listeners*, those channels will need specialized dynamics processing capable of creating great sound *regardless* of program content and bitrate. They will need *Sensus®*.
OmniaONE Multicast was designed from the ground up for provisioning audio for codecs operating at these low bitrates. With *Sensus®*, the innovative algorithm inside OmniaONE Multicast, it is now possible to have consistently high audio quality with a minimum of codec-induced artifacts. OmniaONE Multicast creates highly listenable audio lacking the dull, muffled, 'swirley' sound usually associated with codecs operated at extremely low bitrates.

So… what's so smart about Sensus®?

The fact is, *Sensus®* is smart. In real time it predicts program content that will be troublesome for the codec, and by modifying it's own algorithms can make appropriate changes to the program material before it ever reaches the codec![1] The result is consistently high audio quality through a codec-based system, even at very low (18kbps – 21kbps) bitrates.

The human voice is very difficult to code at low bitrates without quality and intelligibility suffering. But OmniaONE Multicast with *Sensus®* can generate clean, smooth, crystal clear audio that's consistently great sounding no matter what the codec or bitrate is.

--- Important Note ---

[1] It is *extremely* important to never directly audition the output of the OmniaONE Multicast for audio quality without the audio being first routed through a codec!

Why?

The processed output of the OmniaONE Multicast has been 'pre-corrected' for the characteristics of the following codec and because of this the audio may contain strange sounding artifacts that will imitate the 'inverse' of what that codec will do. Because of this the audio exiting the OmniaONE Multicast may be unpleasant to listen to and will certainly be inferior to that which will exit the codec later on.

In other words, what you hear at the output of the OmniaONE Multicast will bear no relationship to the audio quality that will be achieved *after* the audio has passed through the coding process!

Need a corollary to this?

It's like trying to taste a pizza while still in the grocery store and staring at the raw ingredients that haven't been purchased yet.

Thank you for selecting the incredible OmniaONE Multicast Audio Processor. Your continued patronage and support are appreciated.
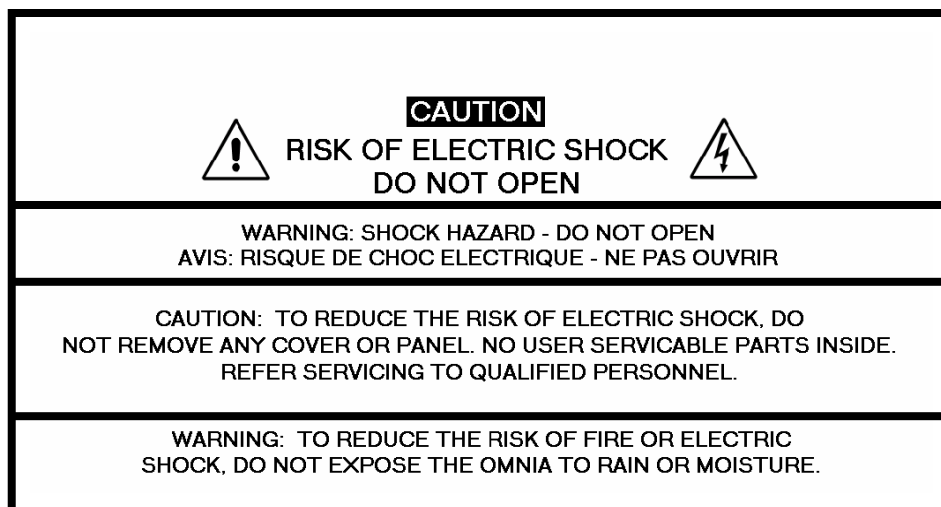

Sincerely,

The Omnia Development Team

SAFETY INSTRUCTIONS

1. Read All Instructions. **All safety and operating instructions must be read before operating the product.**

2. Retain All Instructions. **All safety and operating instructions must be retained for future reference.**

3. Heed All Warnings. **All warnings on the product and those listed in the operating instructions must be adhered to.**

4. Follow All Instructions. **All operating and product usage instructions must be followed.**

5. Heat. **This product must be situated away from any heat sources such as radiators, heat registers, stoves, or other products (including power amplifiers) that produce heat.**

6. Ventilation. **Slots and openings in the product are provided for ventilation. They ensure reliable operations of the product, keeping it from overheating. These openings must not be blocked nor covered during operation. This product should not be placed into a rack unless proper ventilation is provided through following the manufacturer's installation procedures.**

7. Water and Moisture. **Do not use this product near water – for example; near a bath tub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool or the like.**

8. Attachments. **Do not use any attachments not recommended by the product manufacturer as they may cause hazards.**

9. Power Sources. **This product must be operated from the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supplied to your facility, consult your local power company.**

10. Grounding and Polarization. **This product is equipped with a polarized AC plug with integral safety ground pin. Do not defeat the safety ground in any manner.**

11. Power Cord Protection. **Power supply cords must be routed so that they are not likely to be walked on nor pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord connects to the product.**

12. Lightning. **For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the AC wall outlet. This will prevent damage to the product due to lightning and power supply surges.**

13. Overloading. **Do not overload AC wall outlets, extension cords, or integral convenience outlets as this can result in a fire or electric shock hazard.**

14. Object and Liquid Entry. **Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind into the product.**

15. Accessories. **Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious damage to a child or adult, and serious damage to the product. Any mounting of the product needs to follow manufacturer's installation recommendations.**

16. A Product and Cart Combination **should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and the cart combination to overturn.**

17. Servicing. **Refer all servicing of the product to qualified service personnel.**

18. Damage Requiring Service. **Unplug this product from the AC wall outlet and refer servicing to qualified service personnel under the following conditions:**

- **When the AC plug is damaged.**

- **If liquid has been spilled or objects have fallen into the equipment.**

- **If the product has been exposed to rain or moisture.**

- **If the product does not operate normally (following operating instructions).**

- **If the product has been dropped or damaged in any way.**

- **When the product exhibits a distinct change in performance. This indicates a need for service.**

19. Replacement Parts. **When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazards.**

20. Safety Check. **Upon completion of any repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating condition.**

21. Cleaning. **Do not use liquid cleaners or aerosol cleaners. Use only a damp cloth for cleaning.**

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HAZARD / WARNING LABELS

CAUTION

⚠ **RISK OF ELECTRIC SHOCK** ⚡
DO NOT OPEN

WARNING: SHOCK HAZARD - DO NOT OPEN
AVIS: RISQUE DE CHOC ELECTRIQUE - NE PAS OUVRIR

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO
NOT REMOVE ANY COVER OR PANEL. NO USER SERVICABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED PERSONNEL.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC
SHOCK, DO NOT EXPOSE THE OMNIA TO RAIN OR MOISTURE.

The **Exclamation Point** symbol, within an equilateral triangle, alerts the user to the presence of important operating and maintenance (servicing) instructions in product literature and instruction manuals.

The Lightning Flash With Arrowhead symbol, within an equilateral triangle, alerts the user to the presence of non-insulated dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

WARNING -- This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions in this manual it may cause interference to radio communications. The device has been formally submitted for testing and found to comply with the limits for a Class B computing device (pursuant to subpart J of Part 15 FCC Rules) and has been designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, and the user and at his expense will be required to take any measures required to correct interference.

CANADA WARNING – This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications. Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limits applicables aux brouillage radioelectrique edicte par le ministere des Communications de Canada.

CE CONFORMANCE – This device complies with the requirements of the EEC Council Directives: 93/68/EEC (CE Marking); 73/23/EEC (Safety – low voltage directive); 89/336/EEC (electromagnetic compatibility). Conformity is declared to those standards: EN50081-1, EN50082-1.

LITHIUM BATTERY CAUTION – There is a danger of explosion if the internal battery is replaced incorrectly or shorted. Replace the battery only with same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

USE OF SHIELDED CABLING – In order to conform to the CE requirements for High Frequency radiation, shielded cables must be used for all audio and data connections.

NOTE: When the unit is operated in an extremely high RF environment, it may be helpful to connect cable shields to the XLR-connector terminal that connects cable shield to chassis ground, not to pin 1. Additionally, a 0.01uF capacitor connected between XLR pin-1 and the chassis terminal may be helpful in some instances.

RoHS COMPLIANCE – The RoHS Directive stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment". This Directive bans the placing on the European market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants. OmniaONE Multicast is in compliance with the EU RoHS Directive.

Manual Update Notification

Audio Processing – a unique art form that we take <u>very</u> seriously!

As part of our dedication to the science of audio processing we will continue to improve and update the Omnia product and its documentation based on our ongoing research, real-world field experience, and the valued input from our many thousands of loyal customers.

We strongly encourage our customers to visit our Omnia website for product enhancement announcements, software updates, updated user manuals, and customer support bulletins.

The following URLs have been included for your convenience:

Manual Updates	http://www.omniaaudio.com/support/manuals.htm
Frequently Asked Questions (FAQ)	http://www.omniaaudio.com/support/faq.htm
Tech Tips & Support Bulletins	http://www.omniaaudio.com/tech/tips.htm
Software Upgrades & Remote Software	http://www.omniaaudio.com/support/updates.htm
White Papers & Technical Discussions	http://www.omniaaudio.com/tech/default.htm

Chapter-1: Installation

Pre-Installation Tasks

Please take a few minutes to read through this chapter before proceeding with the installation. This section offers common procedures for installing your new OmniaONE processor.

About This Manual

This manual is written to cover the OmniaONE Multicast. If you are setting up a different version of the OmniaONE, please refer to the instruction manual for that product.

OmniaONE Components

By now, you've unpacked the shipping carton to gain access to this manual. Now is the time to inspect the OmniaONE unit and its shipping carton for any signs of shipping damage. Such damage must be reported to your carrier for any claims. The OmniaONE shipping box includes the following components:

- ➢ OmniaONE processor.

- ➢ OmniaONE Operating Manual in PDF format on Compact Disc.

- ➢ Warranty Registration Card. (Please complete the form and return/FAX it to Telos/Omnia)

- ➢ Two IEC Power Cords, one for use in the US, and one for use in Europe.

- ➢ One each Male and Female XLR to StudioHUB® RJ45 adaptor cables.

AC Power Environment

The OmniaONE subsystem is a DSP-based microcomputer, and therefore requires reasonably clean AC power environment just as any modern computer system does. And even though the OmniaONE power supply is equipped with robust AC transient suppression, we recommend that external transient suppression and/or an Uninterruptible Power Supply (UPS) be employed.

At transmitter sites there can be heavy transients on the power lines as well as significant surges introduced into the power system by frequent lighting strikes. These are unwelcome power line events and can damage even the most robust equipment. Therefore you should give the AC power environment and installation practices thorough consideration before plugging in the OmniaONE (or any other microcomputer-based equipment).

A White Paper by one of our Support Engineers can be found on the Telos Systems website at the URL listed below. It details proper grounding and contains links to some surge suppression products for both the power mains and the often-neglected telephone, Ethernet and ISDN line connections that can (and do) conduct powerful surges into the equipment.

http://www.telos-systems.com/techtalk/surge.htm

Installation & Connections

Throughout this section reference is made to "software parameters." These are part of the User Interface, which is covered in detail in Chapter 2.

Rack Mounting

The OmniaONE requires one RU (1.75" [44.45 mm]) of rack space. Rack mount the unit using four rack screws. If only two screws are going to be used, they should be in the bottom holes in the Omnia front panel. No other two-screw mounting arrangement will prevent distortion of the front panel!

Adequate ventilation should be provided, and it is always good engineering practice to allow one blank rack space immediately above and below the Omnia, especially if equipment generating significant heat is located below the unit. You may install 1RU (1.75") vented or solid rack panels to fill these spaces.

The processor should be installed into a properly grounded 19" equipment rack. Refer to Chapter X, "OmniaONE User Tips", for additional considerations on where to physically locate your processor.

AC Power Connection
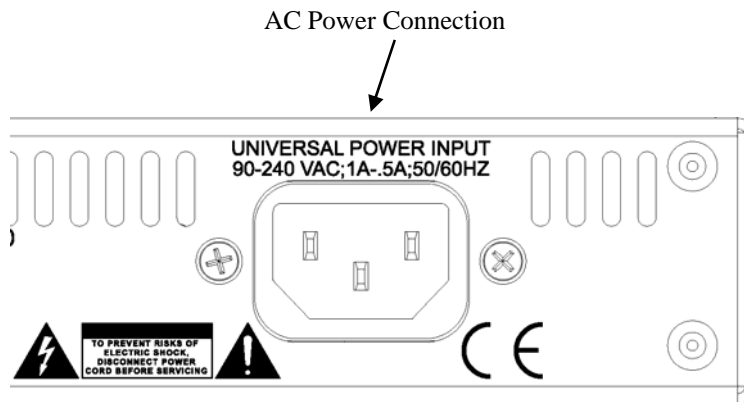
OmniaONE utilizes an un-switched EMI-filtered IEC power-entry module.

OmniaONE's automatic voltage–sensing, high-efficiency switching power supply allows it to operate on AC mains voltages from 100 to 240 VAC and from source frequencies of either 50 or 60 Hz.

In the USA, plug the provided IEC type AC power cord into the unit and then into a grounded AC outlet.

Outside of the USA you must use the appropriate power cord that complies with local electrical regulations.

After power is first applied to the OmniaONE, the LCD screen, the "in" and "out" LED's and the rightmost segments of the LED bargraph meters should light. After about 20 seconds the LCD screen should show "OmniaONE Multicast" and at about 30 seconds the Main Menu should appear. Once the Main Menu appears the unit is ready for use.

Rear Panel Connections

OmniaONE Rear Panel
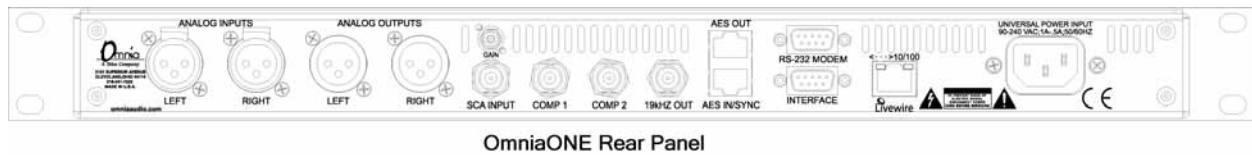
Analog Audio Inputs and Outputs

Balanced XLR-type connectors are used as input connectors for the analog audio. Both analog and digital input sources may be connected simultaneously, however, only the input source that has been selected is active. Analog/Digital/Livewire Input source selection is done through the "*Source*" software parameter setting in the Input/Output / Input Menu.

The stereo analog inputs are designed for standard +4dBu balanced signals. Pin 2 is Hot.

Individual Left and Right analog outputs are available on two male XLR jacks. Pin 2 is Hot.
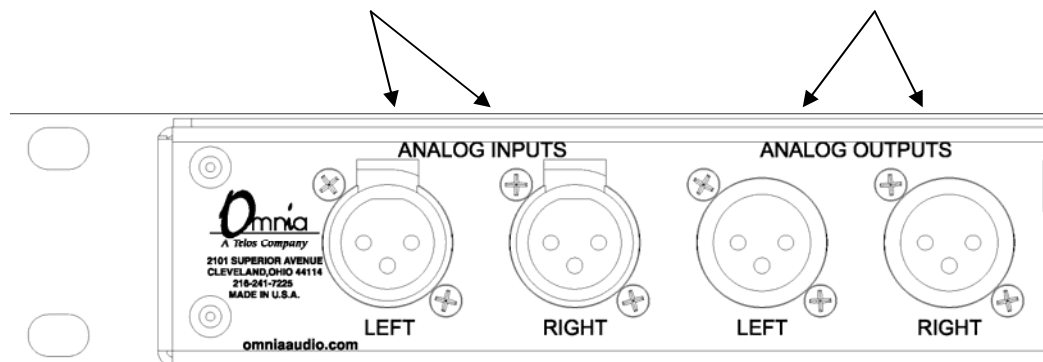
A Note About Relative Phase:

If the relative phase of your installation (including the OmniaONE) differs from that of your existing system, your announcers may feel that they sound "weird" in their headphones. If this occurs, then the relative phase of the processor is 180 degrees from what your air talent is used to. To remedy this, you can either reverse the polarity of both of the analog inputs or simply change the **Invert** setting to **[Both]** in the Input submenu of the Input/Output menu.

AES/EBU Digital Input, AES/EBU External Sync Input, and AES/EBU Output
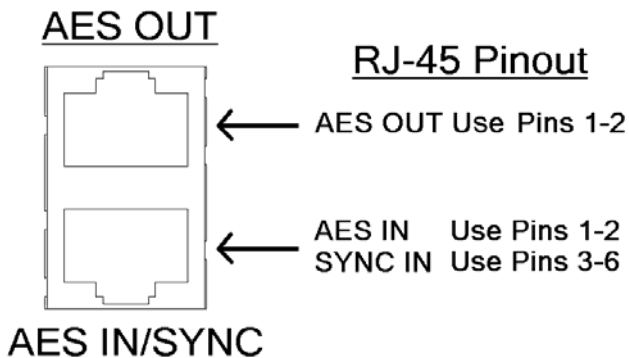
The digital AES/EBU (AES-3) inputs (IN and EXT. SYNC) use industry-familiar RJ-45 connectors and utilize the StudioHUB+ wiring standard[1]. They accept any sampling rate between 32kHz and 96kHz. No user adjustment of the sample rate is necessary on the AES-3 input as a high-quality digital sample rate converter is built in. Individual channel gain and level setting for both analog and digital domains is done using the **Input Gain** software parameter settings in the Input Menu. There is one AES-3 output on a standard RJ-45 connector that provides an output at selectable sampling rates.

Note: The analog and digital outputs are active simultaneously.

[1] More information about the StudioHUB+® wiring scheme can be found at: http://www.studiohub.com/

For your convenience, a pair of XLR adaptor cables are supplied with the unit. The male XLR lead with the *GREEN* shrink tubing is used for AES OUT. The male XLR lead with the *RED* shrink tubing is not used. The female XLR lead with the *GREEN* shrink tubing is used for AES IN and the female XLR lead with the *RED* shrink tubing is used for AES EXTERNAL SYNC IN.

Ethernet Connection

The RJ-45 10BaseT / 100BaseT Ethernet / Livewire I/O jack can be used simultaneously for both TCP/IP based remote control of your OmniaONE and audio input/output to your existing Livewire network.

Please note that the Remote Control and Livewire functionality are not yet implemented in the current software but will be available with a free downloadable software update. Please check the Omnia website for new software announcements, download links and manual updates at: http://www.omniaaudio.com/
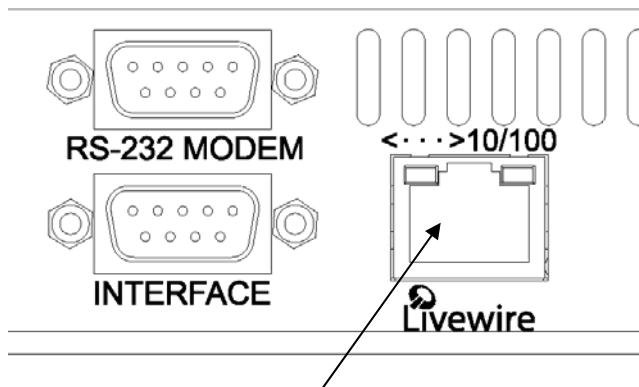
Ethernet 10BaseT/100BaseT Remote and Livewire I/O

RS-232 Modem Connection (DB-9F)

This DB9-female connector can be used to connect an external dialup modem for a bi-directional computer remote control connection.[1]

NOTE: This connector is for a remote control external modem connection only. Please see Appendix B for information on how to use a terminal program along with an internal RS-232 connector for troubleshooting purposes.

RS-232 Modem Port
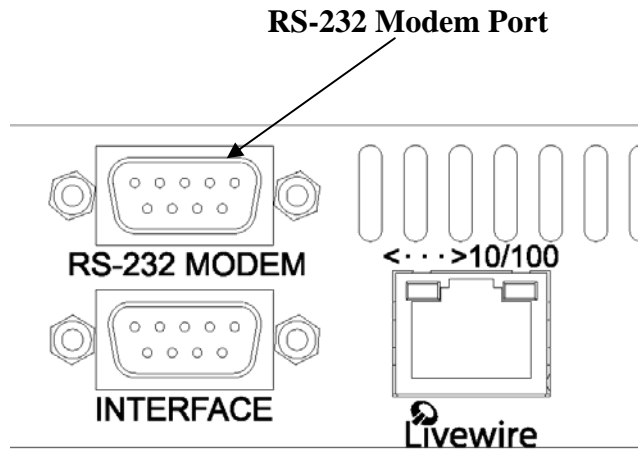
NOTE: You must use a standard straight-through serial cable and *not* a null modem cable when connecting the RS-232 connector of the Omnia and the external modem. Typically this would be 9-pin to 25-pin cable. (External modems traditionally have 25 pin connectors in "DCE" configuration. The OmniaONE has a 9 pin in "DTE" configuration, so the standard 9-pin to 25-pin cable will work).

[1]The setup and operation of the Omnia Remote Control application is covered in detail in Appendix C.

Please note that the Remote Control functionality is not yet implemented in the current software but will be available with a free downloadable software update. Please check the Omnia website for new software announcements, download links and manual updates at: http://www.omniaaudio.com/

General Purpose Interface (GPI) (DB-9M)

This DB9-male connector serves as a four-input, optoisolated interface to the Omnia's internal trigger script functions. Four of the pins are "trigger" inputs, four are "ground" and the remaining pin is +5V power. The trigger inputs can be used to dynamically alter the OmniaONE's operation in response to logic transitions on the interface connection. Virtually any parameter of the Omnia can be controlled using the Trigger Scripts.

The Trigger Script Interface Editor is a standard component of the OmniaONE Remote Control application and is covered in detail in **Appendix C.**

Please note that the Remote Control and Trigger Script functionality are not yet implemented in the current software but will be available with a free downloadable software update. Please check the Omnia website for new software announcements, download links and manual updates at: http://www.omniaaudio.com/

DB-9M GPI "Interface" Connector
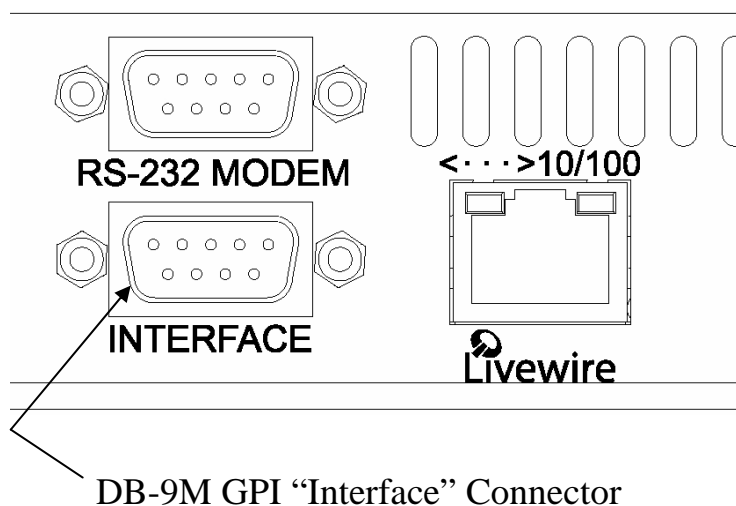
Powering Up

Now you are ready to power up the OmniaONE for the first time.
Connect AC power to the unit using the appropriate supplied power cable for your location.
 (There is no power switch!)

When the OmniaONE is first powered on, audio will appear at the analog audio outputs in approximately ten seconds. The AES/EBU outputs also become usable at this time however full initialization of the AES/EBU ports is not complete for several more seconds and a small audio glitch may be heard when the final sample rate converter initialization is complete. Once the boot process is finished the following Main Menu will appear:

Chapter-2: Getting To Know Your OmniaONE

The OmniaONE User Interface

Now that your OmniaONE is rack-mounted, connected to a program audio source, and turned on, you're ready to learn how to operate it! This chapter covers the Front Panel User Interface, your window into the OmniaONE processor.

A front panel jog-wheel with integral push switch, LED bargraph peak-reading level meters and a backlit LCD display that is switchable between menu and AGC/Limiter metering screens make up the primary OmniaONE User Interface. The front panel menu access may be password protected to prevent unauthorized tampering with processing or presets.

<u>OmniaONE Key Front Panel Features</u>

Headphone Level Control

A standard ¼" TRS stereo headphone jack is located at the left side of the front panel and allows the processed signal to be monitored. The Headphone volume level control is physically located to the right of the headphone jack. The headphone amplifier itself is a high-headroom design and is driven by its own high quality D/A converter that is independent of the analog XLR outputs. Therefore level changes in either output will not affect the other.

Level Meters & Processing Bargraphs

The top two of the three horizontal meters show digital sample-accurate peak representations of the left and right channel input or output levels. Whether these bargraphs are displaying Input or Output levels is selectable from within the Input/Output menu. A front panel indicator confirms which level view has been selected, Input or Output.

The bottom horizontal meter (marked "comp / aux") is not currently used in the Multicast.

Audio I/O Level Display

Either input or output levels can be displayed. The highest LED illuminated indicates digital sample-accurate peak signal levels. The meters are calibrated in decibels below full scale digital (0 dBFS), which is the absolute maximum level in the digital domain.

Audio I/O Level Display

Processing Meter Display

In "Meter Display" Mode the vertical bargraphs show all of the processing activity of the AGC and Limiter sections within the OmniaONE. If the menu is currently displayed on the OmniaONE's LCD screen, press and hold the jog-wheel for two seconds and the processing meter display should appear as shown below.

To return to the menu display mode simply click the jog wheel once. (See "Using the Jog Wheel" on the next Page)

Notes: For any meter, a change from a solid bar to a checkerboard pattern indicates a "gated" condition in that band. The wideband AGC and four-band AGCs will recover to a resting gain setting which coincides with the RTZ (Return To Zero) levels set for each band.
The bargraph for the final limiter (F) may not indicate any G/R, but it is operating. This is due to the very fast peak timing that is employed, which may be occurring faster than the screen is updated.

Processing Meter Display
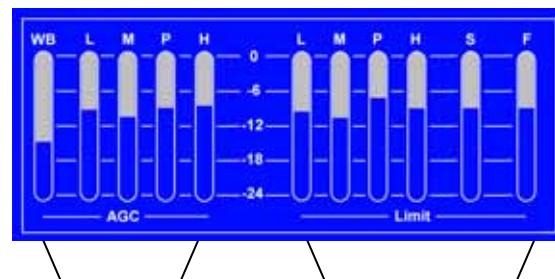
AGC Meters   Limiter Meters

WB…. Wide Band   L….. Low Band
L……. Low Band   M…. Mid Band
M…… Mid Band   P….. Presence Band
P…… Presence Band   H….. High Band
H…… High Band   S……Sensus®
                          F……Final Limiter

Using the Jog Wheel

The main user control for the OmniaONE is the easy to use jog wheel with its integral push-switch. Using the control is both intuitive and efficient, making it easy to navigate the menu structure of the OmniaONE. Processing changes and system adjustments can be quickly made with ease without having to remember multiple controls, their positions, and what they do in each menu. The behavior of the OmniaONE's menu system is consistent across pages and is easy to learn. We believe that you will quickly become comfortable with how it works, and appreciate its simplicity.

Clockwise rotation moves the highlighting in a menu downward and increases a value when editing parameters.

Counterclockwise rotation moves the highlighting in a menu upward and decreases a value when editing parameters.

Pressing inward on the jog-wheel activates the Enter, Return or Select button function as follows:

Pressing the jog-wheel inward once (also called "clicking") selects the highlighted menu item or accepts the current parameter value. Think of it as a vertical mouse button.

Pressing and holding the jog-wheel in for two seconds will switch the LCD screen to a display of the processing meters so that the gain-reduction activity of the AGC and Limiter sections can be monitored.

Clicking once when the metering screen is displayed will return the display to the menu screen.

Clockwise rotation moves the highlighting downward through the menu items and increases the value when editing parameters.

CW

The ENTER, RETURN, or SELECT button. Pressing the jog-wheel once selects the highlighted menu item or accepts the current parameter.

CCW

Press and hold the jog wheel for two seconds to switch between menu and meter screens.

Counter-clockwise rotation moves the highlighting upward through the menu items and decreases the value when editing parameters.

Main Menu

The OmniaONE menu system has been designed to be intuitive and simple to use. Most operating parameters are found under one of the menu headings and sub-headings, allowing adjustments to be made quickly and with ease. Rotating the jog-wheel sequentially highlights each menu item in turn.

When the jog wheel is pressed inward (clicked) while a menu item is highlighted it will open that item's submenu. Similar behavior occurs when selections are made within the various submenus.

To return to the previous level, rotate the jog wheel clockwise until **<-Exit** is highlighted and then press the jog wheel inward. (Click) This will return you to the next highest level in the menu structure. NOTE: Some of the longer menus have an **<-Exit** option at the top of the menu as well as at the bottom.

The *OmniaONE Main Menu* offers five selections**:**

- *Preset*

- *Processing*

- *Input/Output*

- *Administrative*

- *Lock Front Panel* (not visible in the above screenshot)

User Interface Tutorial – Input Source Selection and Peak Level Setting

The following two exercises are a useful introduction to the user interface. Start from the Main Menu (as displayed when the unit is first turned on).

The first exercise changes a parameter selection (the **Input Source** selection):

➢ Rotate the jog-wheel to highlight **Input/Output**.

➢ Click the jog-wheel (push on the wheel once until a click is felt and release) to bring up the **Input/Output** menu.

➢ Rotate the jog-wheel to highlight **Input** and click.

➢ Rotate the jog-wheel to highlight **Input Src** and click.

➢ The factory default selection for Input Source is Analog. To change the input selection to AES/EBU digital, rotate the jog-wheel until **[AES/EBU]** is displayed and click. If you are using the analog inputs, rotate the jog wheel to display **[Analog]** and click to reselect the analog inputs.

➢ To return to the top level of the Main Menu, rotate the jog-wheel to highlight **<-EXIT** and click. Repeat until the top level (Main Menu) is reached. NOTE: Many of the OmniaONE's menus have an **<-EXIT** selection at both the top and bottom of the menu.

The next exercise adjusts a parameter that uses a value (the analog master input level setting):

➢ The Main Menu display should still be showing on the LCD screen. If not, click the jog-wheel to display it.

➢ Highlight *Input/Output* and click.

➢ Highlight *Mtr Select*, click, rotate the jog wheel until **[Input]** is displayed and click. This sets the first 2 LED meters to monitor the Left and Right channel input levels.

➢ Rotate the jog wheel clockwise to highlight *Input* and click.

➢ Rotate the jog wheel to highlight *Anlg Level* and click the jog-wheel to select the control.

➢ Rotate the jog-wheel CW to increase the input level. Rotate the jog-wheel CCW to decrease the input level. This control adjusts both channels together in precise 0.5 dB steps. The gain in dB is shown to the right of the "control." Watch the Left and Right channel LED meters while adjusting per the following paragraph below.

Proper Setting of Input Levels

With normal program audio levels applied, a correct input level setting will result in **peak** indications on the L & R LED meters achieving between –15 and –12 dBFS or a little higher. This gain setting corresponds to system headroom of about 12 –15 dB. You may adjust the input level for more headroom if you wish (by lowering the levels to increase headroom). Setting the input level for higher meter indications (less headroom) is strongly discouraged unless there is another level-control device prior to the OmniaONE that will keep the input levels from reaching the maximum digital level of 0 dBFS.

➢ Once the desired level setting is reached, click the jog-wheel to accept that value. This returns the jog-wheel to Select Mode.

➢ You may highlight and click *Right Trim* to adjust its gain separately from the left channel if the input source is not well balanced. In this mode the right channel gain can be adjusted over a range of plus and minus 3 dB relative to the gain setting of the left channel.

➢ To return to the top level of the Main Menu, rotate the jog-wheel to highlight **<-Exit** and click. Repeat until the top level (Main Menu) is reached.

All of the OmniaONE's software parameters are set in a similar fashion using the jog-wheel to scroll through menu items. Clicking a highlighted item selects it; when that item is a control, the jog-wheel adjusts the value or level. Clicking accepts the value or level and returns the jog-wheel to Select Mode.

Note: Altering any processing or gain parameter will instantly be reflected in a change in the OmniaONE's output characteristics because adjustments occur in real time. Therefore any adjustments you make will be instantly heard as they occur.

Chapter-3: Getting The Sound You Want

In general, applications requiring audio processing prior to a codec don't rely heavily on absolute loudness for their overall success. Loudness is still important of course – you do want to be heard – but it is not the most important thing. It has been well established that codecs generally do not like extremely processed audio applied to their inputs because with very dense audio there are fewer opportunities to hide coding artifacts (these opportunities to hide coding action are commonly referred to as codec entropy).

If you believe that you're in a density war and you feel a need to react, we can provide some suggestions that should help. Conversely, if you have the luxury to strive for increased sound quality, we've got suggestions for you too! There will always be a subjective *compromise* whenever there is a desire to shift the processing priority from the highest *quality* setting to those generating the highest *loudness*.

OmniaONE Multicast has been designed to minimize the trade-offs between quality and loudness, and we recommend that before starting the process of *cranking it up*, try to determine beforehand what sonic characteristics might be lacking.

In many cases it's not just about increasing the drive to the limiters. Instead, it can be as non-intuitive as creating the *illusion* of greater loudness by changing something simple – like a time constant. Sometimes the old adage of *less is more* really applies!

Please give the following content some thought as it may assist you in developing an overall fine-tuning plan if you feel changes beyond our factory presets are justified.

A Word About Density, Clarity, and Intelligibility

Processing for the coded audio world is quite a bit different than what is done for FM-Stereo and AM. There are two significant differences, and both impact the overall sound of a coded transmission: First, there is no pre-emphasis network in coded audio. Second, clipping should never be used for peak control.

In conventional broadcast applications the method of clipping that was used contributed substantially to the quality vs. loudness tradeoff – it was a fairly simple two-way tug of war.

In the coded domain the tradeoff is much different - it becomes a three-way tug of war between quality, loudness, and audible artifacts. Using the rules for conventional processing will cause trouble in a coded audio environment. Why? Because Codecs *complain*. And they complain in the form of nasty and objectionable artifacts when harmonic or intermodulation (IMD) distortion is presented to their input. In fact, dynamic peak limiters employing extremely fast time constants (which generates a form of program-dependent IMD) can easily cause serious trouble for a codec.

Quality Versus Density

The primary trade-off between quality and artifacts will be located within the processor's limiter sections. With increased depth of limiting, intermodulation distortion increases and the 'fast' activity of the limiters causes the audio to sound "tight" or "squashed". If limiting is taken to the extreme, the sound can be perceived as "pumping," "breathing," "dense," or "mushy." It can even induce exaggerated "swish/swirl" artifacts from the codec.

Please remember that the **_core_** objective of the OmniaONE Multicast product is maximum intelligibility at low bitrates and processing that creates heavy density can completely mask that effort. A codec provisioning processor is in quite a different role than a conventional on-air processor. It is far more of a tool than a weapon.

The following sections are provided to assist you in designing the personality of your sound. As we said earlier, there is no precise recipe for setting up audio processing because each application is different. However there are a few basics that we can share with you that can help get you to where you want to go. Setting up processing for the absolute best end product usually requires a concerted effort, some extended periods of critical listening, and making a few intelligently chosen and subtle changes over time. It will be time and effort well spent, and all you need to know up front is that you must:

- ➢ Know your goals (have a plan).
- ➢ Take your time.
- ➢ Always adjust deliberately and methodically.
- ➢ Listen critically before making more adjustments.

Increasing Density/Loudness

Try to resist the temptation to *crank* up the aggressive processing sections. They will definitely add loudness but usually at the cost of quality and intelligibility. Many times, just building a bit more RMS energy in the AGC sections will do the trick.

The following are some suggestions on where to begin to make changes. For best results you should try them in the order we have listed below.

Increasing loudness can be accomplished in five ways:

1. Alter the following parameters in the AGC:
   - ▪ Increase the *Drive* to the AGC sections.
   - ▪ Increase the *Release* settings to make the bands operate faster.

2. Modify the Multiband Limiter sections:
   - ▪ Increase the *Drive* to the Limiter section.
   - ▪ Increase the *Release* settings to make the bands operate faster.

   Note that slowing the *Attack* time by using a lower setting can help make things sound more natural when faster *Release* times are used. But be careful not to allow too many fast transients through to the final limiter section.

3. Set the *Hold* threshold in each band to a lower value.

4. A combination of all of the above (yes, it sounds crazy but it's true)!

Always resist the temptation to make too many changes at once because it then becomes difficult to determine why, or why not, an adjustment made the change you hear. It is better to make small adjustments to a small number of controls at a time, and then listen to the result with a wide variety of program material. Once you have satisfactory results in one area (like overall density) you can then move the focus to the next area that you feel needs more tweaking.

Don't be afraid to experiment with different styles of processing! Our presets are good starting points and are not restricted to any particular format because of their name!

Some users prefer their processing to be perceptibly loud but very dynamic. While this may not result in the *loudest* sound, it gives the illusion of competitive loudness while still retaining a lot of detail and clarity. To achieve this sound you should target most adjustments to the Limiter sections, and avoid heavy use of the Final Limiter and fast settings in the AGC sections. Using very fast attack and release times in the multi-band limiters - without pushing them beyond 5dB or so of gain reduction - keeps IM distortion to a minimum *and* generates higher RMS levels. This translates into higher perceived loudness.

On the other hand, using larger amounts of drive to the multi-band limiters, along with faster release times will generate far more consistency and density. Increases in final limiting depth (more drive) will further add to this. The end effect is that the audio is now consistently loud - at all times.

The drawback to this kind of sound is that when taken to extremes, the excessive *density* can cause listener fatigue and add additional coding artifacts. While OmniaONE Multicast is designed to minimize listener fatigue, when adjusted to do so it is capable of generating large amounts of density that could eventually lead to listener fatigue.

Adding More Detail—When Loudness Isn't The Last Word

Now that we've "squished the grape," lets look at what it takes to undo a signal that is being too heavily processed. Basically, we'll just be reversing the procedures listed above and in this order:

1. Reduce the *Drive* to the Final Limiter.

2. Back off on the influence of the Limiter stages:
  • Reduce the amount of *Drive*.
  • Lower the *Release* settings in each band to slow down recovery.
  • Raise the threshold of the *Hold* function.

3. Ease up on the Wideband-AGC sections:
  • Reduce the *Drive* to the Wideband-AGC.
  • Lower the *Release* setting to cause it to operate slower.

Backing off the limiting sections first will allow the processing to still retain a level of loudness while restoring punch and quality. Start with reducing the *Final Limiter* amount in 0.5 dB steps. It's surprising how much detail can be restored from such a small change. Generally, a change in the *Final Limiter* drive will have the most noticeable effect on quality, but it will also affect the relative loudness level, too. You'll need to find a "happy medium" that's right for your application.

Equalization (EQ) Changes

Tailoring the shape of the overall audio spectrum can be done in four different ways:

➢ Adjusting the *Drive* to the individual bands from within the *XOver* menu, which sets the input levels to the multi-band AGC sections.

➢ Changing the relative amount of *Drive* to the multi-band limiters.

➢ Adjusting one or more bands to have faster release times than the others.

➢ Adjusting the settings within the final *Mixer*.

All four options will provide a noticeable change in EQ and each will have a different character. We suggest you use the first two listed options before trying others. In each case the EQ change you make is followed by a *dynamically* controlled stage, so the subsequent AGC or Limiter will counter any excessive EQ adjustments.

The last option, adjusting the *Mixer*, is designed to provide a final *minor* trim to the audio spectrum. Since this stage is *after* all of the dynamic multi-band AGC and Peak Limiting, a radical change in level in the *Mixer* could result in excessive look-ahead final limiting in that band's frequency range. We suggest that any changes implemented here be limited to about 0.5 dB to 0.7 dB of boost <u>maximum</u>. Alternately, a decrease in mix levels can be done in any desired amount and without fear of final limiter overdrive.

Thunder Bass

OmniaONE Multicast has the power to shake the walls with low end! If your source material has it, OmniaONE Multicast can expose that deep bass and do it with muscle! Tailoring Thunder Bass for more dominance is simple, and is done by adjusting the following parameters and in the order listed:

1. Increase the amount of **Bass** boost in the *Enhance* section.

2. Increase the **Drive** to *Low Frequency Limiter.*

3. Increase the **Release** setting in the *Low Frequency Limiter.*

Just as in the section on 'overdoing' processing, again moderation is the key. If all of the above changes are made in unison there is a possibility of severe low frequency buildup. This would unbalance the audio spectrum and produce the illusion of "lost" presence and high frequencies.

Generally, an increase in the Bass boost alone will provide a sufficient enhancement to the low end. Bass adjustments should typically be done after selecting the preset you wish to use and the low pass filter that is appropriate for the codec to be used.

Adjusting processing for coded audio is different than conventional radio. While many of the dynamics functions are the same, i.e. compression, limiting, EQ, etc, please consider that the audio processor is a tool to improve the performance of the codec. This is especially true at lower bitrates. When making processing adjustments, try to avoid building too much density in the presence and high frequency ranges. Density in this spectra cause codec efficiency to become reduced and artifacts increased.

Even though Sensus® technology is applied downstream from the main processing and will improve system performance, remember that the processor is a sum of its collective *dynamics* parts and the result will be based on the cumulative effect of all of the settings. When adjustments are being made pay particular attention to program content that segues from music to voice and back again. If everything is working properly the vocal quality should not change due to the coding process. If this is noticed, try reducing the Sensus® function value by one adjustment click and then reevaluate.

Chapter-4: Main Menu Selections

This section presents an overview of the five Main Menu items, (**Preset:, Processing**, **Input/Output**, **Administrative and Lock Front Panel**) their submenus (if any), and details about each of the adjustable controls within.

Preset

OmniaONE is equipped with a selection of factory presets that can be used to instantly configure the processing for common applications. The currently loaded preset is displayed to the right of **Preset:** on the top line of the Main Menu.

Highlighting **Preset:** and clicking the jog wheel (see **Using the Jog Wheel** on Pg. 24) will open the Preset menu.

Rotating the jog wheel will scroll through all of the factory presets as well as any user presets that have been stored within the unit's non-volatile memory. The currently loaded preset will appear with square brackets around it.

Clicking the jog wheel will load the displayed preset into the OmniaONE, instantly setting the various processing parameters.

To exit the **Preset** menu without loading a preset, rotate the jog wheel clockwise until ***cancel*** is displayed and click.

In the Multicast, there are two groups of factory presets, Music and Talk. Within each group, there are presets for each of four bitrates commonly used by codecs following the OmniaONE: 24, 32, 48 and 64 kbps.

By starting with one of the factory presets (usually the one named closest to the primary programming and bitrate to be used on the channel the OmniaONE Multicast is processing) and then altering it using the controls in the **Processing** menu, you may change the sound of a preset and then save it with your changes as a user preset for either immediate use or later recall.

By alternately loading different presets you may compare the sound between them.

Here in the **Preset:** menu, you may select and load presets to use, but not save, delete, or rename them. Those operations may be accomplished from within the **Processing** menu.

Processing

Highlighting and clicking **Processing** from the main menu opens up the Processing submenu that contains these options: **Adjust Processing, Save Preset, Delete Preset, Rename Preset** and **<-Exit.** This is where the sound of the OmniaONE can be fine-tuned and customized. Once customized, this is also where your user presets are saved, deleted and renamed. Each submenu in the **Adjust Processing** menu can be highlighted, clicked to open, and the individual controls within can be adjusted to individual taste.

Since you cannot build a preset from scratch, a factory preset <u>must</u> be used as a starting point for creating your "signature sound." Each processor parameter may be adjusted to taste as required. Once the processing is adjusted, the **Save Preset** function is used to store your changes as a new user preset to non-volatile internal memory.

Using the **Delete Preset** and **Rename Preset** options, existing user presets may be deleted from memory or renamed as needed. The original factory presets can never be deleted or renamed.

We will discuss the **Save, Delete, Rename** and **<-Exit** options first before delving into the details of the **Adjust Processing** menu.

Save Preset

This option saves any changes you have made to the currently running preset into the OmniaONE's non-volatile memory. Changes can be saved over an existing *user* preset (without renaming it) or as a new *user* preset with a new name. You may not save a *factory* preset over itself with the same name and attempting this will generate the error message: "Cannot overwrite factory preset. Save preset with new name."

Presets can contain up to 10 characters.

To save your changes proceed as follows:

Highlight **Save Preset** and click. "Name" will be highlighted and the Name field will automatically display the existing preset name. If you wish to overwrite this existing preset with your changes, just rotate the jog wheel clockwise to highlight the **Save** button and click. Your changes will be saved to the existing preset.

If instead, you wish to save your changes as a new user preset with a different name, click the jog wheel while "Name" is highlighted and the editing cursor will appear, highlighting the first character of the existing preset name.

This is "select" mode.

At this point you can scroll left and right through the text by rotating the jog wheel knob. Be careful not to scroll clockwise past the blank space just after the last character of the preset name or "select" mode will be cancelled. If this happens, simply rotate the knob counter-clockwise until "Name" is highlighted and click to re-enter "select" mode.

When you reach the character you want to edit, click. This puts the cursor in "edit" mode. You can now change that character by scrolling through the character list with the knob. When the desired character is found, click. This will return the cursor to "select" mode and you can again turn the knob to select the next character to edit.

-To delete a character... Select the character to be deleted, click, choose the " < " symbol and click again to delete that character. Characters can only be deleted one at a time.

-To insert a character between 2 existing characters... Select the character just after where the new character is to be inserted, click, choose the " ^ " symbol and click again. The new character appears. Now rotate the knob to select the desired character for it and click to accept. (Note that this inserts a new character before the one selected, and keeps the originally selected character intact as what it was before choosing "^")

When you are finished, simply rotate the knob clockwise (with the cursor in "select" mode) until the **Save** button is highlighted and click to save the preset. Your new user preset will now appear in the **Preset:** menu.

-To cancel at any time without saving… With the cursor in "select" mode, rotate the knob clockwise until **Cancel** is highlighted and click.

Delete Preset

This option allows a preset to be deleted. You may never delete a factory preset. An error message will be generated if you attempt to do so. You may delete the last preset that was loaded. The loaded settings, along with any changes, will continue to "live on" as the current settings, but cannot be recalled again until they are saved.

To delete a user preset highlight **Delete Preset** and click. Rotate the jog wheel to display the preset to be deleted. Click the jog wheel and that preset will be *instantly* deleted. **Warning: There is no delete confirmation dialog!**

If you wish to exit without deleting a preset, rotate the jog wheel clockwise until **cancel** is displayed in the preset list and click.

Rename Preset

A preset in the list of stored user presets can be renamed at any time. Factory presets cannot be renamed.

To rename a user preset highlight **Rename Preset** and click. Rotate the jog wheel to display the preset to be renamed and click.

Edit the preset name as described above in the **Save Preset** section.

To exit without renaming the preset, rotate the jog wheel until **cancel** is displayed and click.

<-Exit

Click on this option to return to the Main Menu.

Adjust Processing

This submenu allows changes to be made in any of the OmniaONE's several dozen processing parameters. These adjustments alter the sound and texture of the audio. Increasing any setting will lead to more aggressive processing. For example, a higher drive setting adds more gain into the dynamics section, a higher attack or release setting means a faster time constant, a higher gate threshold setting means more gating will occur, and a higher (farther to the right on the control) setting for a filter means more filtering is occurring (so the lowest frequency settings for a low pass filter are farthest to the right on the control).

Depending on the type of control adjusted and its range, the changes you make can affect the sound in subtle or extreme ways. Our advice is to make a limited number of changes at a time, make those changes in small increments, and then listen to the results for a period of time before making any further adjustments. Keep in mind that should you get "lost" you can always go back to where you started by simply recalling the preset that you started with. The factory presets cannot be overwritten.

<-Exit

Click on this option to return to the **Processing** submenu.

Pre-processing

HPF (High Pass Filter)

The high pass filter allows you to remove subsonic energy from the input audio prior to further processing. In so doing, intermodulation distortion performance of the processor and the audio path following it are improved, and processing resources are not wasted processing inaudible sounds that have no acoustically relevant information.

Phase Rot (Phase Rotator)

The phase rotator improves waveform symmetry for program material that is highly asymmetrical in nature. Examples of such programming are the human voice, and sources with non-sinusoidal waveforms such as certain string and wind instruments, as well as certain sounds created by electronic synthesizers. By removing waveform asymmetry from the input program material, cleaner processing results because any limiting that occurs is able to work equally on both positive and negative excursions of the audio waveform.

Wideband AGC

WB AGC (Bypass, Engage)

The wideband Automatic Gain Control (AGC) stage can be bypassed if desired, although more consistency is achieved when this stage is used.

AGC Drv (AGC Drive)

This control adjusts the amount of drive to the wideband AGC stage. Increasing the drive causes deeper compression to be achieved, and deeper compression allows quieter passages in the input audio to be raised further than if lesser drive (and less compression) was used.

AGC Att (AGC Attack)

The attack control adjusts how fast the AGC responds to sudden increases in audio level, and higher numbers equate to faster response times. Faster attack times reduce the transient nature of the input audio, while slower attack times improve it. Extremely slow attack times must be used with caution because allowances must be made in later stages to not overload them during the time when the broadband AGC is adjusting the level downwards.

AGC Rls (AGC Release)

The release control adjusts how fast the AGC recovers from periods of more gain reduction when the input audio levels fall. Faster release times (higher numbers) result in a more dense sound. Even though the Omnia uses program controlled release algorithms, setting the control for extremely fast release times can result in 'pumping'.

Gt Thresh (Gate Threshold)

When the input audio falls below a certain level, the gain control action of the AGC stage is "frozen" by the gate. The level at which this freeze, or hold takes place is controlled by the setting of the Gate Threshold control. Higher numbers cause the gate to activate at higher audio levels. In most applications this control should be adjusted to cause gating action to occur when the input audio falls about 20dB below nominal. The action of gate also prevents noise rush up during periods of no audio or during pauses in speech.

RTZ Speed (Return To Zero Speed)

RTZ stands for Return To Zero. What RTZ does is return the gain of the WB AGC section to an internally determined amount of gain reduction in the absence of audio. RTZ speed controls how fast this adjustment takes place – i.e., how long it takes the AGC to move to the target RTZ platform level.

<-Exit

Click on this option to return to the **Adjust Processing** submenu.

Enhancers

Deep Bass

Adds 'girth' to the audio by enhancing very low frequencies such as kick drum fundamentals or very low bass notes that may be present in the input audio program.

Phat Bass

An Omnia exclusive, Phat Bass adds harmonic overtones to the lower bass frequencies. The addition of these overtones causes small speakers to seem to produce bass response that they are

not actually capable of producing because the human brain equates the presence of low frequency harmonics to the missing fundamentals that the small speaker is unable to reproduce. On systems with larger speakers, the effect of Phat Bass becomes subtler because the extended frequency response of those systems allows the fundamentals of the low notes to be heard, masking the added harmonics contributed by Phat Bass. Be careful though, too much Phat Bass boost can lead to excessive gain reduction in the lower AGC bands and may cause muddiness with certain program material. A little goes a long way.

<-Exit

Click on this option to return to the **Adjust Processing** submenu.

Xover (Crossover)

Low Drive

Adjusts the amount of gain reduction in the Low Band AGC. Higher numbers result in more drive and because of the increased compression, a more consistent output from the band.

Mid Drive

Adjusts the amount of gain reduction in the Mid Band AGC. Higher numbers result in more drive and because of the increased compression, a more consistent output from the band.

Pres Drive

Adjusts the amount of gain reduction in the Presence Band AGC. Higher numbers result in more drive and because of the increased compression, a more consistent output from the band.

Hi Drive

Adjusts the amount of gain reduction in the High Band AGC. Higher numbers result in more drive and because of the increased compression, a more consistent output from the band.

<-Exit

Click on this option to return to the **Adjust Processing** submenu.

Low Band AGC

Attack

The attack control adjusts how fast the AGC responds to sudden increases in audio level, and higher numbers equate to faster response times. Faster attack times reduce the transient nature of the input audio, while slower attack times improve it.   Extremely slow attack times must be used with caution because allowances must be made in later stages to not overload them during the time when the broadband AGC is adjusting the level downwards. Likewise, extremely fast attack times (especially when combined with very slow release times) can "punch holes" or overreact to the band of audio being processed.

Release

The release control adjusts how fast the AGC recovers from periods of more gain reduction when the input audio levels fall. Faster release times (higher numbers) result in a more dense sound. Even though the Omnia uses program controlled release algorithms, setting the control for extremely fast release times can result in 'pumping'.

Gt Thresh (Gate Threshold)

When the input audio falls below a certain level, the gain control action of the AGC stage is "frozen" by the gate. The level at which this freeze, or hold takes place is controlled by the setting of the Gate Threshold control. Higher numbers cause the gate to activate at higher audio levels. In most applications this control should be adjusted to cause gating action to occur when the input audio falls about 20dB below nominal. The action of gate also prevents noise rush up during periods of no audio or during pauses in speech.

RTZ Speed (Return To Zero Speed)

RTZ stands for Return To Zero. What RTZ does is return the gain of the AGC band to the selected amount of gain reduction (See RTZ Level below) in the absence of audio. RTZ speed controls how fast this adjustment takes place – i.e., how long it takes the AGC to move to the target RTZ level.

RTZ Lvl (Return To Zero Level)

This control adjusts the gain level to be achieved by the AGC section during lapses in audio. The primary purpose of RTZ is to prevent the AGC from increasing the gain unnecessarily during lapses in audio, which would result in an increase in noise level.

<-Exit

Click on this option to return to the **Adjust Processing** submenu.

Mid Band AGC

See description of settings for Low Band AGC

Pres Band AGC (Presence Band AGC)

See description of settings for Low Band AGC

High Band AGC

See description of settings for Low Band AGC

Low Band Limiter

LFLim Drv (Low Frequency Limiter Drive)

Adjusts the drive level to the individual Limiter band. Used when you desire more or less density in a specific band. These Limiter Drive controls can also be used as secondary dynamic EQ controls after the Drive controls in the AGC Xover.

LFLim Att (Low Frequency Limiter Attack)

The attack control adjusts how fast the limiter responds to sudden increases in audio level, and higher numbers equate to faster response times. Faster attack times reduce the transient nature of the input audio, while slower attack times improve it.   Extremely slow attack times must be used with caution because allowances must be made in the following final limiter stage so as not to overload it during the time when the limiter is adjusting the level downwards.

LFLim Rls (Low Frequency Limiter Release)

The release control adjusts how fast the limiter recovers from periods of more gain reduction when the input audio levels fall. Faster release times (higher numbers) result in a more dense sound. Even though the Omnia uses program controlled release algorithms, setting the control for extremely fast release times can result in 'pumping' as well as extremely dense-sounding (fatiguing) audio.

LFLim Hold (Low Frequency Limiter Hold Threshold)

During operation of the limiter, the algorithm is watching for very small decreases in audio level, such as what occurs right after a sudden peak. When this occurs, the limiter release is temporarily stopped. The result is a drastic reduction in intermodulation distortion and a more open sound, even though the audio is still quite dense. The level at which the hold takes place is controlled by the setting of the hold Thresh control. Higher numbers cause the hold to activate at higher audio levels. The action of limiter hold also works in conjunction with the preceding AGC gates to reduce noise rush up during periods of no audio or pauses in speech.

<-Exit

Click on this option to return to the **Adjust Processing** submenu.

Mid Band Limiter

See description of settings for Low Band Limiter

Presence Band Limiter

See description of settings for Low Band Limiter

High Band Limiter

See description of settings for Low Band Limiter

Mixer

Low Band

Adjusts the output level of the low band limiter into the following final limiting stage. Higher numbers result in more low frequencies and too much mix level can make the following final limiter work unnecessarily hard.

Mid Band

Adjusts the output level of the mid band limiter into the overall mix. Higher numbers result in more mid frequencies and too much mix level can make the following final limiter work unnecessarily hard.

Presence Band

Adjusts the output level of the presence band limiter into the overall mix. Higher numbers result in more presence frequencies and too much mix level can make the following final limiter work unnecessarily hard.

Hi Band

Adjusts the output level of the high band limiter into the overall mix. Higher numbers result in more high frequencies and too much mix level can make the following final limiter work unnecessarily hard.

<-Exit

Click on this option to return to the **Adjust Processing** submenu.

Sensus®

Sen Freq (Sensus® Frequency)

This sets the range where the SENSUS® function begins its magic. For example, a setting of 5kHz will program the SENSUS® algorithm to focus on frequencies of 5kHz and higher. You should start with the 13kHz setting, and then select lower frequency settings until any coding artifacts are tamed. There are 8 available adjustment frequencies between 13kHz and 1kHz.

Sen Level (Sensus® Level)

Sets the amount of codec conditioning to be applied to the audio. Increasing the setting adds more SENSUS® control. Extreme settings -- those high enough to cause noticeable dulling of the program material -- are unnecessary and will not further improve the audio quality through the codec.

Ster Link (Stereo Link)

Under most operating modes, this can be set to Low or OFF. The link control allows dynamic coupling of the stereo to mono ratio. When set to OFF, the Sensus® function will only affect mono material, or signals that are common to the Left/Right channels under stereo conditions. Higher settings of the link adjustment may offer assistance with low bitrates and an inefficient codec.

NOTE: While the Sensus® Frequency and Sensus® Level controls are "algorithmically" independent, from the standpoint of a codec they work in tandem to reduce coding artifacts through a bit reduced system. Always start with the **LPF** (Low Pass Filter) (see *Final Limit*) set as recommended by the table in that section. Then adjust Sensus® Frequency and Sensus® Level controls until satisfactory results are achieved through the codec.

<-Exit

Click on this option to return to the **Adjust Processing** submenu.

Final Limit

Drive

The *Drive* control controls the depth of final limiting. The amount of gain-reduction occurring in the final limiter can be monitored on the Process metering bargraph screen. Note, however, that this meter cannot show extremely fast action in the limiter, so your ear must be the final judge.

LPF Freq (Low Pass Filter Frequency)

This is a **key** control and is used for matching the audio bandwidth of the processed audio to the bitrate of a following codec. Setting this control to the proper bandwidth for the codec's settings will ensure minimal side effects and aliasing distortion products from the codec process. The available settings are: *4kHz*, *6kHz*, *8kHz*, *10kHz*, *13kHz*, *16kHz* and *22kHz.* These are the frequencies at which the low pass filter reaches a minimum of 100dB of attenuation.

One of the most important features that an audio processor for codec provisioning must have is a high quality, low overshoot low pass filter after the final peak control stage. OmniaONE Multicast offers this feature as a low pass output filter that can be set to one of seven stop band frequencies. Each of the filters possess minimal passband ripple and are phase linear below cutoff. Response in the filter stop bands is greater than -100dB.

The following chart recommends low pass filter settings that, in our experience, best complement the AAC+SBR, MP3, and Windows Media (WMA) codecs. They were derived through thousands of hours of critical listening and we feel they are very good starting points for achieving the best overall sound although you may use other settings that you feel are more appropriate for your particular codec application.

AAC/SBR	Output LPF	MP3	Output LPF	WMA	Output LPF
24kbps	8kHz	24kbps	6kHz	24kbps	5kHz - 6kHz
32kbps	10kHz	32kbps	6kHz	32kbps	8kHz
48kbps	13kHz – 16kHz	48kbps	8kHz – 10kHz	48kbps	10kHz – 13kHz
64kbps	16kHz	64kbps	10kHz – 16kHz	64kbps	13kHz – 16kHz

!!!--- IMPORTANT NOTE ---!!!

Always set the low pass filter frequency so that it is at or below half the sampling frequency of the encoder. This must be done in order to comply with the Nyquist Theorem[1]. Doing so will achieve the highest perceived audio quality.

[1] The Nyquist Theorem states that the maximum frequency that may be applied to a sampled data system is one half the sampling frequency. When signals beyond half the sampling frequency are present, aliasing occurs which causes the appearance of an inverted spectral image of the audio spectrum to be "folded around" the lower side of the sampling frequency (it is actually folded symmetrically around both upper and lower sidebands of the sample frequency, however in professional audio applications only the lower sideband is usually audible). When this occurs the original signals and the aliases are not separable by any means!
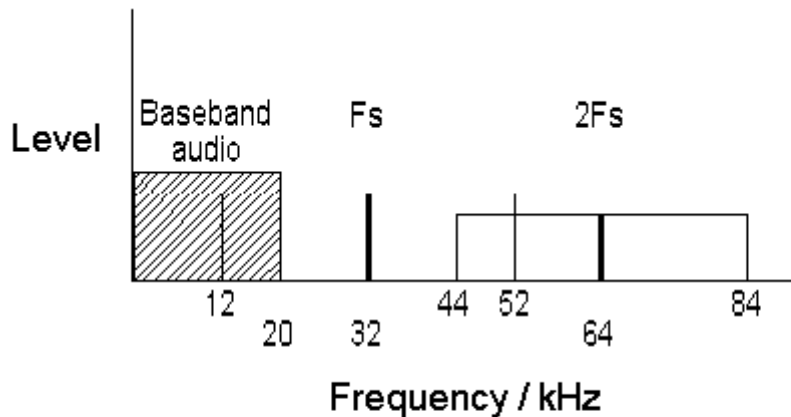
Aliasing example: Sample Frequency = 32 kHz
Signal Frequencies = 0 - 20 kHz
New Images: 12 - 52 kHz and 44 - 84 kHz

<-Exit

Click on this option to return to the **Adjust Processing** submenu.

<-Exit

Click on this option to return to the **Processing** submenu.

Input/Output

This submenu provides level adjustments for the audio inputs and the absolute peak operating level of the Analog, AES-3 (AES/EBU) and Livewire outputs. Choices governing the selection of the input audio source (Analog, AES Digital or Livewire) and signal mode (Stereo or Mono) are also found within these submenus.

These I/O settings are generally "set once and forget" parameters, usually adjusted during initial installation and then left alone. These I/O settings are not saved with a processing preset but can be saved, loaded, deleted or renamed as "I/O Configurations" using options available in this submenu.

Please note that Livewire functionality is not yet implemented in the current software but will be available with a free downloadable software update. Please check the Omnia website for new software announcements, download links and manual updates at: http://www.omniaaudio.com/

Mtr Select (Meter Select)

Selects whether the **Input** levels or **Output** levels are displayed on the front panel L & R LED bargraph meters. Please note that in the initial release software the meters when set to monitor Output levels will only monitor the analog outputs.

Input

There are nine controls under the heading "Input" and each will be explained in the order in which they appear in the menu:

<-Exit

Click on this option to return to the **Input/Output** submenu.

Input Src (Input Source)

Allows the selection of Analog or AES/EBU (digital) as the primary input source to the OmniaONE.

Fover Time (Failover Time)

Failover Time is a feature that when set to a value other than zero (disabled) allows the OmniaONE to automatically select another input source if the currently selected one fails. Failover Time is the amount of time that will elapse after the failure of audio before the unit makes the decision to switch to another input. For instance, if Failover Time is set for seven seconds and the primary audio source fails, seven seconds later the unit will switch to the secondary audio input. If, at any time, audio is restored on the primary input (for 1 second, continuously), the unit will switch back to the primary audio input. It will remain with the primary input unless another failure is detected.

Fover Src (Failover Source)

Failover Source selects which audio input: Analog or AES/EBU digital will serve as the secondary audio input. Note that the audio input that is selected under Input Source (above) will always be the Primary audio input. A source selected under Failover Source will always be the secondary source.

Anlg Level (Analog Level)

Adjusts the master audio input level for the analog inputs which are derived from the rear panel XLR female input connectors. (See **Proper Setting of Input Levels** on Page 26)

Right Trim

Allows a +/-3dB adjustment of the right analog audio channel gain to correct minor left/right balance problems in the input audio. The left channel analog input gain is not affected by this control and is set using the master Analog Level control previously described.

AES Level (AES/EBU Level)

Adjusts the master audio input level for the AES Digital input which is derived from the rear panel RJ-45 StudioHUB® connector. (See **Proper Setting of Input Levels** on Page 26)

Right Trim

Allows a +/-3dB adjustment of the right digital audio channel gain to correct minor left/right balance problems in the input audio. The left channel digital input gain is not affected by this control and is set using the master AES Level control previously described.

Invert

Permits audio phase inversion to be performed in the following combinations:

[None] –   No Channel inversion is performed (factory default)
[Both] –   Both left and right channel phase is inverted.

"Both" is typically selected if it sounds "better" to an announcer (monitoring themselves in headphones using the output of the processing) than "None". One of the two settings should. The goal is to make the relative phase of the headphone feed more in phase with the announcer's own bone conduction. Once set, this setting should remain the same for all announcers using the same headphone feed.

[L]   –   Only the left channel phase is inverted.
[R]   –   Only the right channel phase is inverted.

These settings are present as a convenience to correct 180-degree stereo phase errors in the input audio to the processor or in another device after the processor.

Mono Mode

Allows input signal routing to be reconfigured as follows:

[STEREO]

Factory default. Left and Right input channels are routed to the left and right inputs to the DSP processing chain.

[Mono L]

Configures the DSP processing chain to have both the Left and Right internal channels fed only from the Left Channel of the input source selected. Note that this selection is active in all sources selected as Primary and Secondary (Failover) audio sources.

[Mono R]

Configures the DSP processing chain to have both the Left and Right internal channels fed only from the Right Channel of the input source selected. Note that this selection is active in all sources selected as Primary and Secondary (Failover) audio sources.

[Mono L+R]

Configures the DSP processing chain to have both the Left and Right internal channels fed from the sum of the Left Channel and Right Channels of the input source selected. Note that this selection is active in all sources selected as Primary and Secondary (Failover) audio sources.

[SWAP]

Configures the DSP processing chain to swap the Left and Right internal channels, that is, the DSP Left Channel is fed from Right Channel input and the DSP Right Channel is fed from the Left Channel input. Note that this selection is active in all sources selected as Primary and Secondary (Failover) audio sources.

<-Exit

Click on this option to return to the **Input/Output** submenu.

Output

There are five controls under the heading "Output" and each will be explained in the order in which they appear in the menu:

<-Exit

Click on this option to return to the **Input/Output** submenu

Anlg Level (Analog Level)

Adjusts the master audio Output level for the analog outputs which appear on the rear panel XLR male connectors. This control adjusts both the left and right stereo channel simultaneously.

Right Trim

Allows a +/-3dB adjustment of the right analog audio channel gain to correct minor left/right balance problems in equipment following the OmniaONE. The left channel output gain is not affected by this control and is set using the master Analog Level control previously described.

AES Level (AES/EBU Level)

Adjusts the master audio Output level for the AES Digital Output which appears on the rear panel RJ-45 StudioHUB® connector.

Right Trim

Allows a +/-3dB adjustment of the right digital audio channel gain to correct minor left/right balance problems in equipment following the OmniaONE. The left channel output gain is not affected by this control and is set using the master AES Level control previously described.

Samp. Rate (Sample Rate)

Configures the Output Sample Rate. Options are as follows:

[48k]
Slaves the output sample rate to the Omnia's internal 48kHz sample clock. To use output sample rates other than 48 kHz, Input or External sync must be used.

[Input]
Slaves the output sample rate to the sample rate present on the Omnia's AES digital input. Synchronization is possible over a range of sample rates from 32kHz to 96kHz.

[Ext] (External)

Slaves the output sample rate to the sample rate present on the Omnia's AES SYNC input. Synchronization is possible over a range of sample rates from 32kHz to 96kHz.

<-Exit

Click on this option to return to the **Input/Output** submenu.

Bypass

[Process]

This is the normal default setting where all processing will be active.

[Bypass]

This setting will bypass all processing for test purposes.

Save IO Config

I/O settings are those that affect the audio input and output configuration and allow correct interface with the rest of the airchain / external equipment.

Save IO Config Saves all user settings within the **Input / Output** menu to the system's non-volatile memory as named configuration presets. Use this to save your I/O configuration as the system default or save more than one configuration if the unit will be used with different external equipment configurations. These saved configurations can be recalled using the **Load IO Config** option.

To save an IO configuration proceed as follows:

Highlight **Save IO Config** and click. "Name" will be highlighted and the Name field will display "<none>" if no previous configurations have been saved or it will automatically display the currently loaded configuration's name. If you wish to overwrite this existing configuration with your changes, just rotate the jog wheel clockwise to highlight the **Save** button and click. Your changes will be saved to the existing configuration preset.

If instead, you wish to save your changes as a new configuration preset with a different name, click the jog wheel while "Name" is highlighted and the editing cursor will appear, highlighting the first character of the existing preset name. This is "select" mode. (If no previous configurations were saved, "<none>" will vanish and be replaced by the editing cursor.)

If an existing preset name is present, you can scroll left and right through its text by rotating the jog wheel knob. Be careful not to scroll clockwise past the blank space just after the last character in the name or "select" mode will be cancelled. If this happens, simply rotate the knob counter-clockwise until "Name" is highlighted and click to re-enter "select" mode.

When you reach the character you want to edit, click. This puts the cursor in "edit" mode. You can now change that character by scrolling through the character list with the knob. When the desired character is found, click. This will return the cursor to "select" mode and you can again turn the knob to select the next character to edit.

-To delete a character... Select the character to be deleted, click, choose the " < " symbol and click again to delete that character. Characters can only be deleted one at a time.
-To insert a character between 2 existing characters... Select the character just after where the new character is to be inserted, click, choose the " ^ " symbol and click again. The new character

appears. Now rotate the knob to select the desired character for it and click to accept. (Note that this inserts a new character before the one selected, and keeps the originally selected character intact as what it was before choosing "^")

When you are finished, simply rotate the knob clockwise with the cursor in "select" mode until the **Save** button is highlighted and click to save the configuration preset.

-To cancel at any time without saving... With the cursor in "select" mode, rotate the knob clockwise until **Cancel** is highlighted and click.

Load IO Config

This option allows you to select and load a previously saved IO configuration.

To load a saved IO configuration, highlight **Load IO Config** and click.

Rotate the jog wheel until the desired IO configuration is displayed and click.

To exit without loading a configuration, rotate the jog wheel until ***cancel*** is displayed and click.

Delete IO Config

This option allows a previously saved IO configuration to be deleted.

To delete an IO configuration highlight **Delete IO Config** and click.

Rotate the jog wheel to display the IO configuration to be deleted.

Click the jog wheel and that named configuration will be instantly deleted.

To exit without deleting a saved configuration, rotate the jog wheel until ***cancel*** is displayed and click.

Rename IO Config

This option allows a previously saved IO configuration to be renamed.

To rename an IO configuration highlight **Rename IO Config** and click.

Rotate the jog wheel to display the IO configuration to be renamed and click.

Enter the new configuration name as described above in the **Save IO Config** section.

To exit without renaming a configuration, rotate the jog wheel until ***cancel*** is displayed and click.

<-Exit

Click on this option to return to the **Main Menu**.

Administrative

Several maintenance and utility functions are found in this submenu including various *Security* options to prevent tampering by unauthorized personnel, TCP/IP networking parameters and other system-wide parameters.

About

Presents a dialog displaying the OmniaONE software style, firmware release version and front panel software version currently active in the unit.

Contrast

Adjusts the contrast of the front panel LCD display to optimize it for various viewing angles.

Network Configuration

Allows customization of the network interface configuration. Available parameters are:

IP (IP Address)

Accepts data in the form of four octets to describe the Ipv4 network address assigned to the OmniaONE's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

192 . 168 . 0 . 200

Subnet (Subnet Mask)

Accepts data in the form of four octets to describe the Ipv4 network subnet mask of the OmniaONE's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

255 . 255 . 255 . 0

Gateway

Accepts data in the form of four octets to describe the Ipv4 gateway address assigned to the OmniaONE's network interface. The entries have the form of:

[octet] . [octet] . [octet] . [octet] which when entered may appear as a network address such as:

192 . 168 . 0 . 1

<-Exit
Click on this option to return to the **Administrative** submenu.

Reboot

When selected, initiates a complete system reset, which includes reloading the internal operating system, DSP processing code, and values from the current processing preset and IO configuration.

Security

Remote Con (Remote Control)

[Enabled] Enables remote control access.

[Disabled] Disables remote control access.

Enter Password

Sets the password for both the front panel and remote control access.

The default password is "omnia" (all lower case)

To change the password highlight **Enter Password** and click. The Name field will be automatically highlighted with **\<none\>** displayed. Click and **\<none\>** will vanish and be replaced by the editing cursor.

Rotating the jog wheel clockwise will scroll through the capital letters of the English alphabet first. Rotating it counter-clockwise will scroll through the numeric characters first, and then through the lower case English alphabet. In-between is a blank space with an underscore character.

Once the desired character is found, click to accept that character.

Click again to display the editing cursor and add the next character the same way.

When you are finished and the new password is complete, do not click again to display the editing cursor. Instead, rotate the jog wheel to highlight the **Save** button and click to save the password.

If you wish to cancel without saving the new password, rotate the jog wheel to highlight **Cancel,** click to accept and the operation will be cancelled. The existing password will be retained.

\<-Exit

Click on this option to return to the **Administrative** submenu.

\<-Exit

Click on this option to return to the **Main Menu**.

Lock Front Panel

This is a feature that enables you to lock the front panel in order to prevent inadvertent or unauthorized tampering with control settings and processing parameters. Access via user password is the only way to access the front panel menus when it has been locked via a user-assigned password.

To lock the front panel, highlight **Lock Front Panel** and click.

A warning message will be displayed: "Locking front panel requires password to regain access!"

Rotate the jog wheel and click on "OK" to lock the front panel or "Cancel" to return to the Main Menu without locking the front panel.

The factory default password is "omnia" (all lower case).

Changing the password is done using the **Enter Password** option in the Security section above.

Appendix A: Performance Specifications

OmniaONE Multicast

As of January 2007 – Version 0.9 Software

Note: All measurements made using "Bypass" mode, which is available in the Input/Output Submenu.

General Audio Specifications

Frequency Response: ± 0.50 dB, 20 Hz to 20 kHz with high pass filter disabled.

Distortion: Less than 0.05% THD 20 Hz – 20 kHz bandwidth.

*Signal-Noise Ratio: Greater than -100 dB, 20 Hz –- 20 kHz bandwidth, referenced to 0dBfs

*The measured noise floor will depend upon the settings of the Input and Output Gain controls and is primarily governed by dynamic range of the Crystal Semiconductor A/D Converter which is specified as >100 dB. The dynamic range of the internal digital signal processing chain is >144 dB.

Stereo Separation: Greater than 80 dB, 20 Hz –- 20 kHz; 90 dB typical.

Analog Audio Input: Left/Right Stereo.
Electronically balanced.
Input impedance 10k ohms resistive.
Maximum Input Level +24 dBu.
Nominal Input Level: +4dBu (A +12dBu input results in –12dBFS input meter reading with Input Gain set to 0.0dB. A 0dBu input signal results in a -12dBFS input level when Input Gain is +12dB.)

A/D Conversion: Crystal Semiconductor 24 bit 128x oversampled delta sigma converter with linear-phase anti-aliasing filter. Pre-ADC anti-alias filter, with high-pass filter at <10 Hz.

Connectors: Two, EMI-suppressed XLR-female. Pin 1 chassis ground, Pin 2 "Hot".

Analog Audio Output: Left/Right Stereo. Electronically balanced.
Output Impedance 20 ohms.
Minimum load Impedance 600 ohms.
Output Level adjustable from -2 dBu to +22dBu peak in 0.1dB steps.

D/A Conversion: Crystal Semiconductor CS4390 24 bit, 128x oversampled.

Connectors: Two, EMI-suppressed XLR-male. Pin 1 chassis ground, Pin 2 "Hot".

Digital Audio Input: Configuration: Two-channel stereo per AES3 standard via CS8420 Digital Audio Transceiver with 24-bit resolution. Software selection of stereo, mono from left, mono from right or mono from sum. Automatically accepts sample rates between 24 kHz and 96 kHz.

Connector: EMI-suppressed RJ-45 female pinned according to StudioHub+® standards. Transformer isolated, balanced, and floating according to AES3 standard.

Digital Audio Output: Stereo per AES3 standard. Digital Output sample rate software selectable for internal 48kHz, synchronize to AES input, or synchronize to auxiliary AES sync input (per AES-11 / DARS).

Connector: EMI-suppressed RJ-45 female according to StudioHub+® standards. Transformer isolated, balanced, and floating according to AES3 standard.

Digital Output Level: -22.0 to 0.0 dBFS peak, software adjustable in 0.1dB steps.

Digital Sync Input: Output sample rate can be synchronized to the signal present on the AES/EBU input or to the AES3 signal applied to the Ext. Sync connector.

External Sync Range: Accepts 32kHz to 96 kHz for synchronization of the Digital Output signal to an external reference. Automatically accepts sample rates between 32kHz and 96kHz.

Connector: EMI-suppressed RJ-45 female pinned according to StudioHub+® standards, Transformer isolated, balanced, and floating according to AES3 standard.

Remote Control: 10/100BaseT Ethernet: standard web-based protocol and additional TCP/IP connections.
Direct Serial: RS-232 at 9,600, 19,200, or 57,600 baud (no handshaking); Hayes command set compatible external modem.

Connectors: RS-232 port - EMI-suppressed DB-9 female connector.
Ethernet - Industry standard EMI-suppressed RJ-45 connector.

GPI Interface: Configuration: Four fully optoisolated inputs.
Software sensing of both 'go-high' and 'go-low' transitions.
Inputs are protected to 2000 V AC/DC.
Connector: EMI suppressed DB-9 male.

Control: User-programmable using built-in Trigger Script feature in included OmniaONE Remote Control software. Virtually any parameter of the OmniaONE may be programmed through this interface feature.

Power Requirements: Voltage: 100-250 VAC, 47-63 Hz. Less than 25 VA.

Power Connector: EMI suppressed IEC male.
Detachable 3-wire power cords supplied for US and European use.

Power Supply: Internal. Overvoltage and short circuit protected. Meets EN55022, EN55011 Level B Conducted Emissions. EN61000-4-2, -3, -4, -5, -6 level 3 immunity compliant. Full international safety approval. CE marked.

Environmental: Operating Temperature: 32 to 122 deg. F / 0 to 50 deg. C for all operating voltage ranges. Humidity: 0-95% RH, non-condensing.

Dimensions: 19" wide x 1.75" high x 16" deep (48.26cm wide x 13.335 cm high x 40.64 cm deep) including connectors. Unit requires one EIA rack space for mounting.

Shipping Weight: 10 lbs. / 4.54 kg

**StudioHub® is a registered trademark of Radio Systems.**

Telos/Omnia Research and Development is constantly working to improve the quality of our products. Actual specifications are subject to change or improvement without notice.

Appendix B: Troubleshooting/Service/Warranty

Operational problems with the OmniaONE can sometimes be diagnosed using the RS-232 serial port located inside the top cover of the unit (NOTE: This is not the rear panel "RS-232 MODEM" connector) and a common terminal communications program. Detailed information about the Omnia's boot-up progress may be observed at this internal RS-232 port, as well as viewing of any error messages that may be encountered. This chapter explains the various boot up and error messages that may be encountered while troubleshooting the unit. We'll cover some basic troubleshooting techniques for isolating possible OmniaONE problems in the field, and also how to obtain help or repair service from Omnia.

To take complete advantage of this functionality, you only need a standard terminal program for DOS, Windows, or other operating system. It must be configured for a default baud rate of 19200, no hardware handshaking, and using a terminal emulation for VT100. At Omnia, we commonly use the Hyperterminal© program that ships with Microsoft Windows©, but you can use whatever program you are familiar with. Please see the examples below for how we've set up our connection:
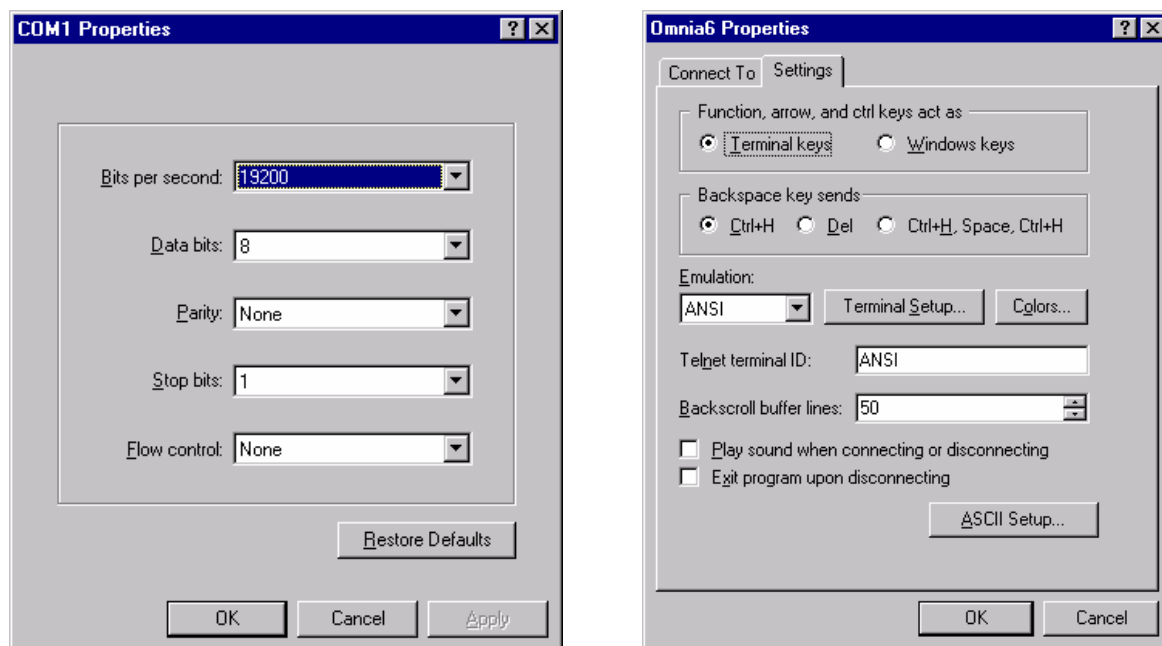
Once these parameters have been entered and saved as a connection profile, they can be used to capture and display (and print) the output of the OmniaONE's RS-232 internal serial port during boot up.

Diagnostic and Error Messages

Electrical and mechanical safety note!

When the Omnia is operated with its chassis top cover removed, you are exposed to potentially lethal voltages.

Before attempting to make voltage measurements, be forewarned that the power supply heat sinks are connected to the AC power line. Avoid these areas whenever the AC power cable is attached to the Omnia. <u>Never</u> attempt to make measurements when the power supply's safety cover is removed.

When reinstalling the top cover, make certain that all thirty screws are replaced, and that they are tightened to a snug fit. Operating the unit with its cover removed or without all of the retaining screws will void your warranty and may compromise the ability of the Omnia to operate in high RF environments.

Narrowing down problems

When actually troubleshooting your OmniaONE, try to ascertain some preliminary information first before embarking on an in-depth problem-solving mission. Take time to carefully consider whether your unit falls into any of the following states:

1. The unit is totally dead. Is the power on? Is the line cord plugged into an outlet that has AC power? Is there an audio input level? Is there an audio output level? Is there a power indication? Is the LCD screen blank, scrambled, or not illuminated? Symptoms like these might indicate a power supply problem. If you wish to examine the power supply, be aware that it is *switching* type, and therefore requires a load in order to start up and operate properly. Voltages measured when the power supply is not connected to the Omnia motherboard may not be correct.

2. The unit has power, but there is no audio output although the processing bargraphs are working. The first thing to verify is whether the front panel jog-wheel is operational. Verification of front panel operation helps narrow down where the problem is. Look at the metering display. If there is input audio but no output audio indications, try cycling the unit's power. If that doesn't bring the operation back to normal, then a hardware failure of some sort has occurred. If you get output levels but have no output audio, verify that the outputs are connected correctly. An analog output connected to a digital device, or a digital output connected to an analog device won't pass audio! Connect the appropriate test generator to the output cables to verify analog/digital audio is making it to the next device.

The next condition to check is to see if the failure has caused the processing to cease. Using program material, check to see if the processing bargraphs are operating. If they are, then it's a good indication that the basic DSP structure is sound and the system's host processor is working. At this point, it would be a good idea to see if the loss of audio is confined to only one output port, e.g. the discrete left/right outputs or the AES/EBU output. Check the signal at each of these locations. If the signal is dead at all three, then this points to a digital audio problem after the dynamic processing DSP chips. If one of the output sections is not operating, then it can be localized to that specific section.

Note: The discrete left/right outputs are operated from their own specialized Digital to Analog converters. Therefore, it's possible for one type of output to fail without affecting the other. Likewise, a failure in the AES/EBU driver section could result in the digital output being dead, while the rest of the system is operational.

3. Unit will not boot.

Obtaining Service

- Omnia Customer Support personnel are available in Cleveland, Ohio, USA, Monday through Friday between 9:00 A.M. and 6:00 P.M., Eastern Time. If outside the U.S.A., please contact the dealer you purchased your Omnia from.

- Before contacting Omnia Customer Support, please have the serial number of the unit (located on a barcode sticker on the rear panel in this format: 0218WXXXX) and a description of the symptoms/problems ready for the technician.

- All units being returned to for service MUST have a Return Authorization (RA) number assigned to them first. Units that are returned without a RA number will experience delays in service.

- Return the Omnia in its original shipping carton if possible. For best treatment, shipping the Omnia in its original factory box protects it as well as possible. Damage caused by improper packaging is not covered under your warranty!

Note: To ensure prompt service, the Return Authorization number must be written prominently on or near the shipping label on the box!

Via the World Wide Web

The Omnia Web site has a wide variety of information that may be useful for product support, applications information, software updates, etc. The URL is: http://www.omniaaudio.com/

Via E-Mail

The customer service e-mail address for Omnia is: support@omniaaudio.com.

Via Phone & Mail (USA and non-European Countries)

Customer service is available by telephone, Monday – Friday between 9:00 A.M. and 6:00 P.M., USA Eastern time zone.

Phone: +1.216.241.7225   Fax: +1.216. 241.4103

Shipping Information: *   Telos / Omnia

2101 Superior Avenue

Cleveland, Ohio 44114   USA

ATTN: To the RA number obtained from Omnia Customer Service

Note: To ensure prompt service, the Return Authorization number must be written prominently on or near the shipping label on the box.

Warranty

This Warranty covers "the Products," which are defined as the various audio equipment, parts, software and accessories manufactured, sold and/or distributed by TLS Corp., d/b/a Omnia (hereinafter "Omnia").

With the exception of software-only items, the Products are warranted to be free from defects in material and workmanship for a period of two years from the date of receipt by the end-user.

Software-only items are warranted to be free from defects in material and workmanship for a period of 90 days from the date of receipt by the end-user.

This warranty is void if the Products are subject to Acts of God, including (without limitation) lightning; improper installation or misuse, including (without limitation) the failure to use telephone and power line surge protection devices; accident; neglect or other damage.

EXCEPT FOR THE ABOVE-STATED WARRANTY, OMNIA MAKES NO WARRANTIES, EXPRESS OR IMPLIED (INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE).

In no event will Omnia, its employees, agents or authorized dealers be liable for incidental or consequential damages, or for loss, damage, or expense directly or indirectly arising from the use of any of the Products or the inability of the end-user to use any of the Products either separately or in combination with other equipment or materials, or from any other cause.

In order to invoke this Warranty, Omnia must receive notice of a warranty claim within the above-stated warranty period and Omnia must authorize warranty coverage. If Omnia authorizes the performance of warranty service, the defective Product must be delivered, shipping prepaid, to: Omnia, 2101 Superior Avenue, Cleveland, Ohio 44114.

Omnia, at its option will either repair or replace the Products and such action shall be the full extent of Omnia's obligation under this Warranty. After the Products are repaired or replaced Omnia will return them to the party that sent the Products, and Omnia will pay for the cost of shipping.

Omnia's authorized dealers are not authorized to assume for Omnia any additional obligations or liabilities in connection with the dealers' sale of the Products.

Omnia products are to be used with registered protective interface devices that satisfy regulatory requirements in their country of use.

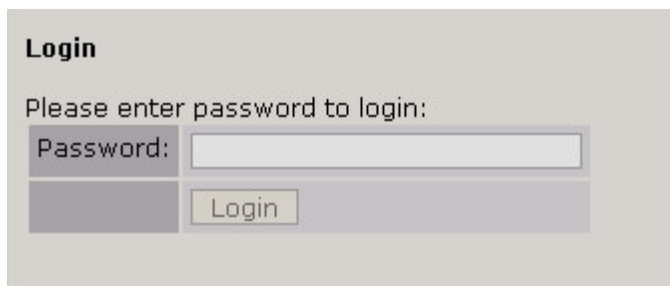# Appendix C: Remote Control & Software Update Procedure

Remote Control

Please note that the Remote Control and Trigger Script functionality are not yet implemented in the current software but will be available with a free downloadable software update. Please check the Omnia website for new software announcements, download links and manual updates at: http://www.omniaaudio.com/

Trigger Scripts

Please note that the Remote Control and Trigger Script functionality are not yet implemented in the current software but will be available with a free downloadable software update. Please check the Omnia website for new software announcements, download links and manual updates at: http://www.omniaaudio.com/

Software Update Procedure

Software updates for the OmniaONE are performed over an Ethernet connection using any standard Web Browser and an update file downloaded from the Omnia website. The OmniaONE contains two software banks and the new software is always uploaded to the inactive bank. This is a safeguard against loss of power or other interruption during the update. In this event, the OmniaONE should still boot into the active bank containing the "old" software (but it is best to avoid interruptions in any case).

To update the OmniaONE software proceed as follows:

1. Download the OmniaONE software update file (.oup) from the Omnia website at: http://www.omniaaudio.com/support/updates.htm and save it to a convenient folder on your computer.

2. Make sure your OmniaONE's Network Configuration settings have been entered appropriately for your network (see Network Configuration on Page 46 for details) and connect your OmniaONE's Ethernet (Livewire) jack to your Ethernet network using a standard Cat.5 cable or directly to a computer using a Cat.5 crossover cable.

3. Open your browser and connect to the OmniaONE by entering: http://xxx.xxx.x.xxx/ in the browser's address bar where the x's in the example above are replaced with the OmniaONE's IP address as entered in Step 2. Once connected you should see the Login screen shown below. Enter the Password (Default is "omnia" – all lower case) and click on the "**Login**" button. (Or simply press "Enter")
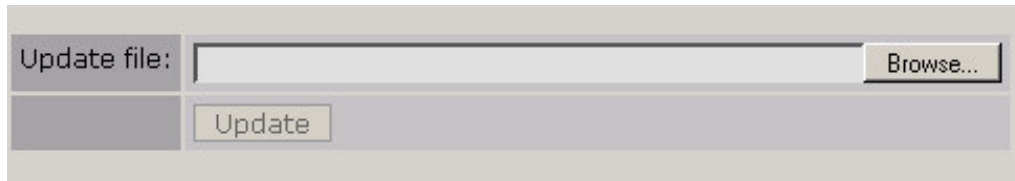

4. The Main Menu should appear. Click on the "**Firmware Update**" option.

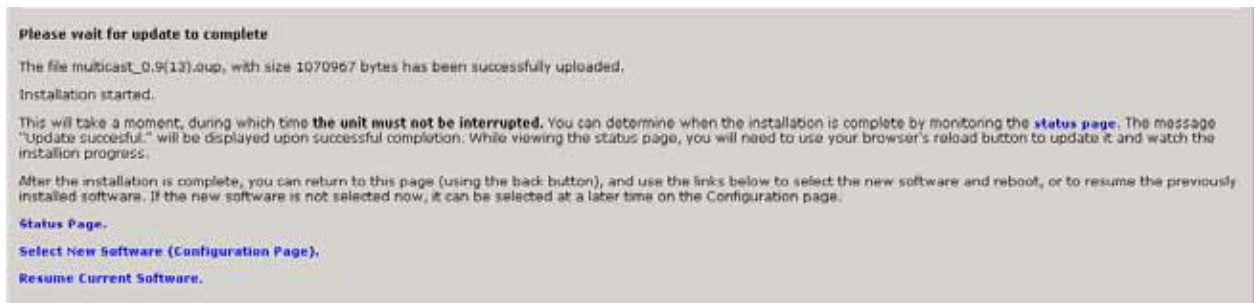5. The "**Confirm Firmware Update**" screen should appear with the following warning:

"Performing an update requires the controls and meters for the audio processor to be stopped. On-air audio will not be interrupted during the update. However, a reboot is required to activate the new software, and this will interrupt the audio. At the end of the process, you will have the option to change the current boot bank (to activate the new software) and reboot or to keep running the current software and reboot later. Do you want to continue the update process?"

After reading the warning message click the "**Continue**" button and the "Update File" dialog should appear.

6. Click the "**Browse**" button, locate the software update file downloaded and saved to your computer in Step 1 and click the "**Update**" button.

The file will now be uploaded to the OmniaONE and this may take up to 5 minutes. Monitoring of the progress of the upload depends on the browser being used but once the file is successfully uploaded to the OmniaONE the following screen should appear:

7. Click the **Status Page** link.
Click your browser's "Refresh Page" button until the message "Update Successful" appears. (see below) Once the "Update Successful" message appears, click your browser's back button. (Behavior here depends on the browser being used – some browsers may require clicking the back button twice and then logging back in – the goal here is to return to the **Configuration** page)

```
Shell invoked to run file: /var/tmp/CF_update/update
Command: #!/bin/sh
Command: cd /var/tmp
Command: tar -xf CF_update.tar CF_update/boot0.jffs.img
Command: flashw -f CF_update/boot0.jffs.img /var/update-bank
Command: xtool usleep 2000000
Execution Finished, Exiting
STATUS: Verifying update integrity and Uncompressing...
Waiting for child 58
STATUS: Verifying product ID...
Waiting for child 60
Waiting for child 62
STATUS: Installing...
Waiting for child 64


Update successful.
```

8. If your back button worked, select the link: "Select New Software (Configuration Page)" If not, log back into the Omnia (default password is "omnia" (all lower case) and from the Main Menu or the navigation menu at the top of the screen, select "**Configuration**".

9. A reboot is required to activate the new software, and this will interrupt the audio. You can now opt to change the current bank, (to activate the new software) Apply and reboot or keep running the current software and reboot later.

   To activate the new version now:

   From the "**Select Software Bank:**" section, select the Bank that contains the new software version and click the "Apply" button. A new page should appear with the following options:

   Software bank "x" selected. (Where "x" is the number of the software bank you just selected: 0 or 1)
   Return to Configuration.
   Reboot Processor.

   To activate the selected bank now, click the **Reboot Processor** option. The processor will reboot and the new software will be activated.

   Once activated its version should show now as the "**Running Software:**" version.

○ Bank 0	Version: Multicast: 0.7 (4)
◉ Bank 1	Version: Multicast: 0.8 (3)
Running Software:	Version: Multicast: 0.8 (3)
	Apply

   To continue running the previous version, click **Return to Configuration** instead. When you are ready to activate it return to the Configuration page and repeat Step 9.

10. You may now close your browser. The software update is complete.